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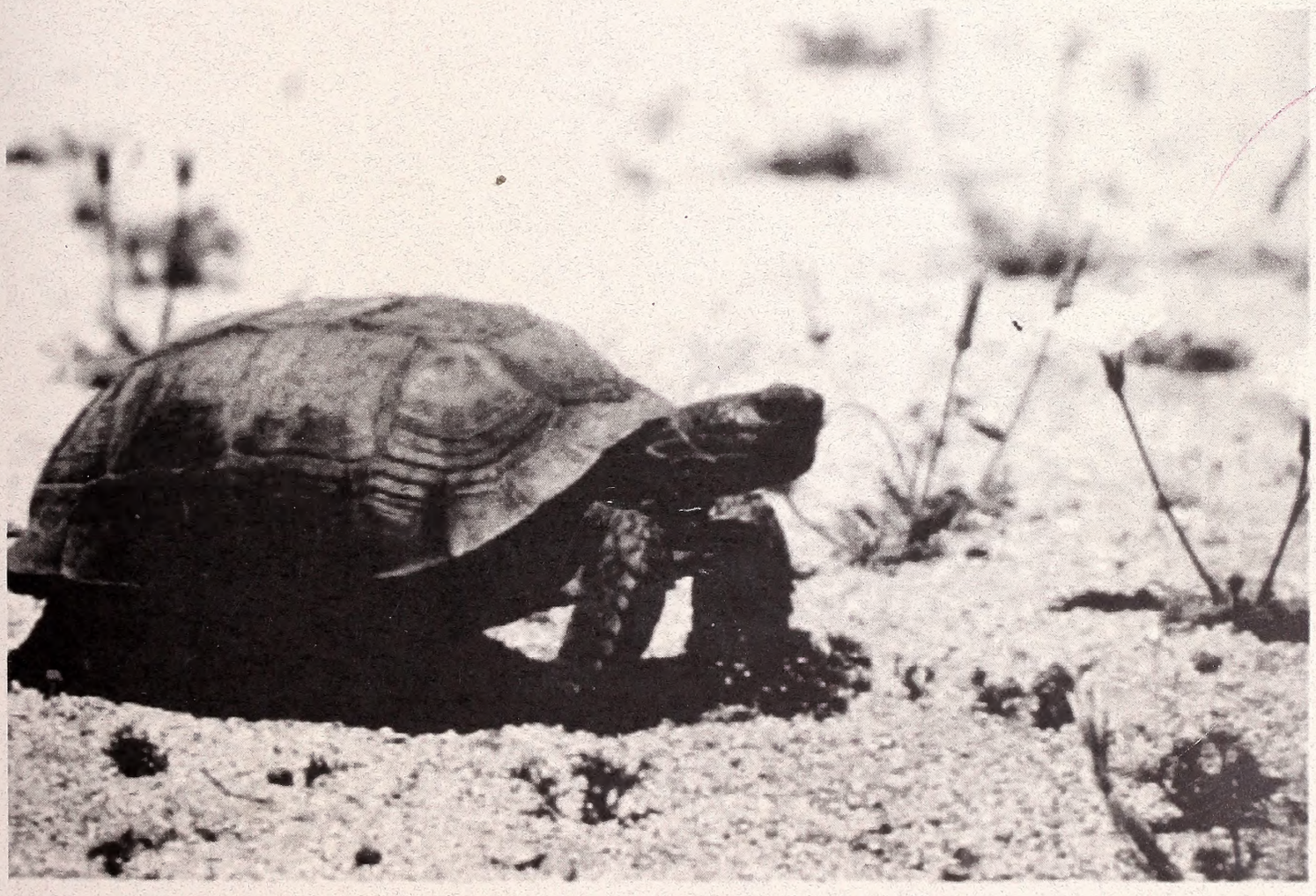
January 2005

Final Environmental Impact Report and Statement for the

West Mojave Plan

A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment

Vol 1A



The Bureau of Land Management Today

Our Vision

To enhance the quality of life for all citizens through the balanced stewardship of America's public lands and resources.

Our Mission

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Our Values

To serve with honesty, integrity, accountability, respect, courage, and commitment to make a difference.

Our Priorities

To improve the health and productivity of the land to support the BLM multiple-use mission.

To cultivate community-based conservation, citizen-centered stewardship, and partnership through consultation, cooperation, and communication.

To respect, value, and support our employees, giving them resources and opportunities to succeed.

To pursue excellence in business practices, improve accountability to our stakeholders, and deliver better service to our customers.

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United States
Department of the Interior
BUREAU OF LAND MANAGEMENT
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

January, 2005

Dear Reader:

Enclosed is the *Final Environmental Impact Report and Statement (Final EIR/S) for the West Mojave Plan*. The Bureau of Land Management (BLM), the federal lead agency, has prepared the Final EIR/S in accordance with the National Environmental Policy Act (NEPA). The County of San Bernardino and the City of Barstow, the California lead agencies, have prepared the Final EIR/S in accordance with the California Environmental Quality Act (CEQA).

This Final EIR/S is a comprehensive environmental analysis of seven alternatives (including the No Action Alternative) that address compliance with the federal and California endangered species acts (FESA and CESA, respectively).

The purpose of the West Mojave Plan is to develop management strategies for the desert tortoise, Mohave ground squirrel and over 100 other sensitive plants and animals that would conserve those species throughout the western Mojave Desert, while at the same time establishing a streamlined program for compliance with the regulatory requirements of FESA and CESA. Agencies, local jurisdictions and others with a stake in the future of the western Mojave Desert have collaborated in the development of the West Mojave Plan.

The public devoted substantial effort to providing in-depth review and input on the Draft EIR/S. During the 90-day public review of the Draft EIR/S, which ended on September 12, 2003, commentators submitted nearly 300 letters. These offered numerous suggestions, comments and opinions concerning the Draft EIR/S. Responses to comments are presented in Chapter 6 of the Final EIR/S, and copies of all letters received can be found on the attached compact disk.

The text of the Final EIR/S includes a number of changes and corrections suggested by commentators. Where the text of the Final EIR/S differs from that presented in the Draft EIR/S, a vertical black line in the left-hand margin indicates the location of the modified or clarified text. A summary of these modifications follows. Because most of the changes consisted of minor modifications, only a selection is presented below.

- Conservation Area adjustments
  - Pisgah Crater (western portion dropped, expansion to northeast)
  - North Edwards (some lands excluded)
  - Alkali Mariposa Lily (realigned to capture the Amargosa Creek drainage, drop

interim conservation areas)

- Biological Transition Areas eliminated (portions added to DWMA)
- New biological objectives for several species
- Tortoise Survey Zones minor modifications
- Fee Zones minor modifications
- BLM DWMA Multiple Use Class M Lands changed to Class L
- Revised Monitoring and Adaptive Management Table
- Additional discussion of cumulative impacts
- Appendix C.1 (Implementation Tasks, Costs and Priorities) Revision
- Compact Disk Additions species accounts, vegetation map, Draft EIR/S comment letters
- BLM Route Designation
    - Adoption of Competitive C Routes Northwest of Spangler Open Area
    - Route Openings in Summit Range
    - Route closures in Fremont Kramer Tortoise DWMA to Offset C Routes
    - Selected closures in small conservation areas
    - Revised Juniper Subregion route network
    - No Action route network is BLM June 30, 2003 Decision Record

The West Mojave Plan proposes a number of amendments to the BLM s California Desert Conservation Area Plan. The BLM planning process includes an opportunity for administrative review through a plan protest to the BLM Director should a previous commentator on the plan believe that the decision has been issued in error. Only those persons or organizations that participated in the planning process may protest. Protests from parties having no previous involvement will be denied without further review. A protesting party may raise only those issues that were submitted for the record during the planning process. New issues raised in the protest period should be directed to the BLM, California Desert District Manager, 22835 Calle San Juan De Los Lagos, Moreno Valley, CA 92553 for consideration in plan implementation, as potential plan amendments, or as otherwise appropriate. The period for filing protests begins when the EPA publishes in the Federal Register its Notice of Receipt of the West Mojave Plan Final EIR/S. To be considered tim ely the protest m ust be postmarked no later than the last day of the 30-day protest period. Also, although not a requirement, it is recommended that the protest be sent by certified mail, return receipt requested. E-mail protests will not be accepted. Faxed protests will be considered as potential valid protests provided (1) that the signed faxed letter is received by the BLM Washington Office protest coordinator by the closing date of the protest period and (2) that the protesting party also provides the original letter by either regular or overnight mail postmarked by the close of the protest period. Please direct faxed protests to BLM Protest Coordinator at 202-452-5112. Please direct the follow-up letter to the appropriate address provided below.

Protest must be filed in writing to: Director (210), Attention: Brenda Williams, P.O. Box 66538, Washington, D.C. 20035, or by overnight mail to: Director (210), Attention: Brenda Williams, 1620 L Street, N.W., Suite 1075, Washington, D.C. 20036. In order to be considered complete, the protest must contain, at a minimum, the following information:

1. The name, mailing address, telephone number, and interest of the person filing the protest.
2. A statement of the issue or issues being protested.
3. A statement of the part or parts of the plan being protested. To the extent possible, this should be done by reference to specific pages, paragraphs, sections, tables, maps, etc. included in the Final EIS.
4. A copy of all documents addressing the issue or issues that were submitted during the planning process or a reference to the date the issue or issues were discussed by you for the record.
5. A concise statement explaining why the decision of the BLM California State Director is believed to be incorrect. This is a critical part of the protest. Take care to document all relevant facts. As much as possible, reference or cite the planning documents, environmental analysis documents, available planning records (i.e. meeting minutes or summaries, correspondence, etc.) A protest that merely expresses disagreement with proposed decision without supporting data will not provide additional basis for the Director's review of the decision.

Please note that comments, including names and street addresses of respondents, are available for public review an/or release under the Freedom of Information Act (FOIA). Individual respondents may request confidentiality. Respondents who wish to withhold name and/or street address from public review or from disclosure under FOIA, must state this prominently at the beginning of the written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials or organizations or businesses, will be made available for public inspection in their entirety.

The BLM Director will promptly render a decision on the protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the Director shall be the final decision of the Department of the Interior.

Sincerely,

Linda Hansen

Linda Hansen
District Manager

Enclosure (2 volume set)

Proposed West Mojave Plan
Final Environmental Impact Report and Statement

Federal Lead Agency:	U.S. Department of the Interior Bureau of Land Management California Desert District Office
California Lead Agencies:	County of San Bernardino Land Use Services Department City of Barstow Community Development Department
Project Location:	Portions of San Bernardino, Inyo, Kern and Los Angeles Counties, California
For Further Information:	Linda Hansen, Bureau of Land Management California Desert District Office 22835 Calle San Juan De Los Lagos Moreno Valley, CA 92553 Randy Scott, County of San Bernardino Land Use Services Department 385 North Arrowhead Avenue San Bernardino, CA 92415 Scott Priester, City of Barstow Community Development Department 220 East Mountain View Street Barstow, CA 92311-2888
Abstract	The West Mojave Plan (Plan) is a habitat conservation plan and federal land use plan amendment that presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel and nearly 100 other sensitive plants and animals and the natural communities of which they are a part, while providing a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (CESA and FESA, respectively). The planning area includes 3.2 million acres of public land and 3.0 million acres of private land. This document was produced through a collaborative effort of state and federal agencies and local jurisdictions.

West Mojave Plan

A Habitat Conservation Plan and
California Desert Conservation Area Plan Amendment

Final Environmental Impact Report And Statement

January 2005

Michael Pool, State Director
Bureau of Land Management

Linda Hansen, District Manager
California Desert District
Bureau of Land Management

Michael E. Hays, Director
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County of San Bernardino

Scott Priester, Director
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City of Barstow

West Mojave Plan

A Habitat Conservation Plan and
California Desert Conservation Area Plan Amendment

Final Environmental Impact Report and Statement

January 2005

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EXECUTIVE SUMMARY

E.1 INTRODUCTION

The West Mojave Plan (Plan) is a habitat conservation plan and federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and nearly 100 other sensitive plants and animals and the natural communities of which they are a part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (CESA and FESA, respectively).

The Plan is being prepared through the collaborative effort of cities, counties, state and federal agencies having jurisdiction over lands within the region. The Plan will allow streamlined project permitting at the local level, equitable sharing of costs among participants, and shared stewardship of biotic resources. The collaborators include:

- **Local Jurisdictions:** The cities of Adelanto, Barstow, California City, Hesperia, Lancaster, Palmdale, Ridgecrest, Twentynine Palms, and Victorville, and the towns of Apple Valley and Yucca Valley; the Counties of Inyo, Kern, Los Angeles and San Bernardino; and the Indian Wells Valley Water District.
- **State of California:** The California Department of Fish and Game and California Department of Transportation
- **Federal:** The Bureau of Land Management and the United States Fish and Wildlife Service.

These agencies and local jurisdictions are cooperating with a variety of non-governmental organizations, including businesses, environmental organizations, user groups and others with a stake in the future management of the planning area, to develop the West Mojave Plan. Over 100 non-governmental organizations (NGO) have participated in this process. Representatives of the agencies, jurisdictions and NGOs comprise the West Mojave ***Supergroup***.

The 9,359,070-acre planning area is located to the north of the Los Angeles metropolitan area. The Plan s conservation program applies to both public and private lands within this area. These lands include 3,263,874 acres of BLM-administered public lands, 3,029,230 acres of private lands and 102,168 acres of lands administered by the State of California.

This Executive Summary is organized as follows:

- A brief description of each of the seven alternatives analyzed by this Environmental Impact Report and Statement (EIR/S).
- A summary of the impacts that would result from implementing each alternative.
- A discussion of the relative likelihood that each of the seven alternatives would achieve the biological goals and objectives established for each of nearly 100 sensitive species addressed by this plan.

Responses to comments received on the Draft EIR/S are presented in Chapter 6. Many of the comments requested modifications or clarifications of either the West Mojave Plan s conservation strategy or the environmental analysis presented in the Draft EIR/S. Where the text of the Final EIR/S differs from that presented in the Draft EIR/S, a vertical black line in the left-hand margin indicates the location of the modified or clarified text. A summary of these modifications follows. Because most of the changes consisted of minor modifications, only a selection is presented below.

- Conservation Area adjustments
  - Pisgah Crater (western portion dropped, expansion to northeast)
  - North Edwards (some lands excluded)
  - Alkali Mariposa Lily (realigned to capture the Amargosa Creek drainage, drop interim conservation areas)
- Biological Transition Areas eliminated (portions added to DWMA)
- New biological objectives for several species
- Tortoise Survey Zones minor modifications
- Fee Zones minor modifications
- BLM DWMA Multiple Use Class M Lands changed to Class L
- Revised Monitoring and Adaptive Management Table
- Additional discussion of cumulative impacts
- Appendix C.1 (Implementation Tasks, Costs and Priorities) Revision
- Compact Disk Additions species accounts, vegetation map, comment letters
- BLM Route Designation
  - Adoption of Competitive C Routes No rthwest of Spangler Open Area
  - Route Openings in Summit Range
  - Route closures in Fremont Kramer Tortoise DWMA to Offset C Routes
  - Selected closures in small conservation areas
  - Revised Juniper Subregion route network
  - No Action route network is BLM June 30, 2003 Decision Record

E.2 ALTERNATIVES

The West Mojave Plan identifies measurable biological goals and objectives for each of the sensitive species that is addressed by the Plan. This Final EIR/S examines seven alternative conservation strategies, each of which presents a different and unique approach to achieving those biological goals and objectives. The seven alternatives include the following:

- **Alternative A: PROPOSED ACTION - HABITAT CONSERVATION PLAN.** This alternative presents a multi-species conservation strategy applicable to public and private lands throughout the planning area. It would serve as (1) an amendment of BLM s CDCA Plan for public lands, and (2) a habit at conservation plan for private lands. Incidental take permits for 49 covered species would be issued to participating local jurisdictions and state agencies.

- **Alternative B: BLM Only.** This alternative consists of those elements of Alternative A that are applicable to, and that could be implemented on, BLM-administered public lands. It is applicable to public lands only.
- **Alternative C: Tortoise Recovery Plan.** This combines those elements of Alternative A that are applicable to the Mohave ground squirrel and other sensitive species with the management program recommended by the 1994 Desert Tortoise (Mojave Population) Recovery Plan. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies. The public expressly requested detailed consideration of this alternative during NEPA scoping meetings.
- **Alternative D: Enhanced Ecosystem Protection.** This alternative places a high priority on the conservation of sensitive plants and animals, even if adoption of those recommendations would limit motorized vehicle access to and multiple use of the western Mojave Desert. Its recommendations had their origin in discussions among the participating agencies and members of the public during NEPA scoping and the development of Alternative A. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies.
- **Alternative E: One DWMA Enhanced Recreation Opportunities.** This alternative places a high priority on multiple uses of desert lands, including motorized vehicle recreation, even if this might preclude the implementation of some of the programs that otherwise might be implemented to conserve species and ecosystems. It also responds to a specific request raised by the public during scoping meetings that the EIR/S explore whether a single DWMA, protecting only the remaining areas of relatively higher tortoise populations, might be an effective means of conserving desert tortoises. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies.
- **Alternative F: No DWMA Aggressive Disease and Raven Management.** This alternative proposes a tortoise conservation strategy that relies on an aggressive program of tortoise disease management and raven control, supported by limited fencing, rather than the establishment of tortoise DWMAs to protect habitat. Subject to these modifications, the Alternative A conservation program for other species would be implemented. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies.
- **Alternative G: No Action.** Existing conservation strategies currently being applied by each of the participating agencies would continue to be implemented.

E.3 SUMMARY OF IMPACTS

Alternatives A through E vary in the amount of new conservation within DWMAs, ACECs, and Conservation Areas from 1.20 million acres (19.8% of the total of undisturbed lands) to 1.79 million acres (29.4%) in Alternative C. These new conservation areas add to the existing 1.15 million acres (18.4%) and achieve much greater protection of desert tortoise habitat. For the primary communities of this habitat, creosote bush scrub and saltbush scrub, the

increase in habitat conservation is 23-34%. The proportional increase is similar for the Mohave ground squirrel.

In addition to increasing the quantity of habitat conserved, the Plan focuses on protecting the highest quality tortoise and ground squirrel habitat, as defined by highest sign counts and live tortoises and persistent capture locations for the Mohave ground squirrel. The alternatives incorporating private land conservation (A, C, D, E) create large habitat blocks capable of sustaining ecosystem processes, landform diversity, all trophic levels and populations large enough to be viable in the face of fluctuations caused by the extreme desert environment. For the desert tortoise, maintenance of conserved habitat with a high carrying capacity is necessary for recovery after the disease runs its course or a cure is found, and after raven predation is reduced.

The Plan presents significant cumulative impacts, both positive and negative to most of the covered species. The beneficial cumulative impacts include the establishment of large, unfragmented habitat blocks, measures to reduce tortoise mortality, measures to minimize disturbance impacts to conserved lands and measures addressing unique components of diversity, such as endemic species, disjuncts and habitat specialists. The provision of incidental take areas where permitting is streamlined accommodates development of large acreages of disturbed lands and degraded habitat. The developed lands put increasing pressure on the conserved lands, from resource extraction, incidental land uses such as utilities and from recreation. The allowable loss of habitat exceeds conservation in all alternatives. Cumulatively this loss would reduce populations of many common species in a very substantial way. As long as the covered species, which are the rarest and those with known declines, are adequately conserved in the Habitat Conservation Area, the cumulative impact would not be significant or adverse. The more common species would survive within the HCA and are present in abundance outside the west Mojave as well.

Although large acreages are available as incidental take areas, not all of these lands would be developed or even disturbed during the term of the Plan. The growth projections for urban development can be accommodated on a small fraction of the land within the ITA. Many areas without water, utilities, or easy access would remain undeveloped, even from rural residences. The monitoring and adaptive management aspects of the Plan would track the success of the conservation measures, and these undeveloped lands would remain available if alterations are needed in the quantity of conserved lands in the future. They are also available for future recreation areas and for developments such as mining or energy production that can be pursued in remote areas. The allocation of lands for different uses achieved by the West Mojave Plan should not be considered as the final determination of land use for the planning area. It is rather a dynamic process of utilizing the best available science and land use planning to achieve conservation of the species and communities known to be in jeopardy. Technologies of the future can and are expected to alter provisions of the Plan to improve upon the implementation of its objectives.

Motorized Vehicle Access Network Mileage: Alternative A proposes minor modifications of a BLM route network adopted on June 30, 2003 that includes 2,265 miles of open routes within a redesign area , 159 m iles within the Ord Pilot region, 406 miles within

ACECs for which route networks were designated after 1980, and 2,268 miles of remaining 1985-87 designations, or 5,098 miles overall, a total that includes single-track motorcycle routes. Proposed mileage of non-motorcycle routes in higher density tortoise population areas would be 384, a decrease from the 439 miles that were open prior to June 30, 2003. The 406 miles within the ACECs would be less than the pre-June 30, 2003 total of 427. Within the Juniper subregion, a redesigned network consisting of 73 miles of open routes and 25 miles of routes limited to use by single-track vehicles (e.g. motorcycles) would replace the 152 miles of open routes adopted on June 30, 2003.

E.4 BIOLOGICAL GOALS AND OBJECTIVES: WOULD THEY BE MET?

E.4.1 Desert Tortoise

This section considers the four biological goals and associated objectives identified for desert tortoise conservation by the USFWS and CDFG in 1998 during biological evaluation meetings (U.S. Bureau of Land Management 1999). The goals and objectives are reiterated, and followed by tables that indicate for each alternative whether the goals and objectives are met or not. Generalized summary statements follow indicating why certain objectives are met or not.

Alternatives are reiterated as follows:

- **Alternative A:** Proposed Action Habitat Conservation Plan
- **Alternative B:** BLM Only
- **Alternative C:** Tortoise Recovery Plan
- **Alternative D:** Enhanced Ecosystem Protection
- **Alternative E:** One DWMA Enhanced Recreation Opportunities
- **Alternative F:** No DWMA Aggressive Disease and Raven Management
- **Alternative G:** No Action

Goal 1: Protect sufficient habitat to ensure long-term tortoise population viability (see Table ES-1).

Objective 1.1: Establish a minimum of three, preferably four, Desert Wildlife Management Areas that would be managed for the long-term survival and recovery of the desert tortoise, and which would also benefit other special-status plant and animal species.
Objective 1.2: Ensure that at least one DWMA exceeds 1,000 square miles in size
Objective 1.3: Design DWMAs so that they are well distributed across the recovery unit, edge-to-area ratios are minimized, impediments to the movement of tortoises are avoided, and (where feasible) boundaries are contiguous.

Table ES-1
Tortoise Biological Goal 1

BIOLOGICAL GOAL 1	SEVEN ALTERNATIVES UNDER CONSIDERATION						
OBJECTIVES	A	B	C	D	E	F	G
1.1 Establish 3 or 4 DWMAs	Yes	Yes	Yes	Yes	No	No	No
1.2 At least one DWMA 1,000 mi^2	Yes	No	Yes	Yes	Yes	No	No
1.3 Good reserve design	Yes	No	Yes	Yes	No	No	No

Alternatives A through D share the common characteristics of establishing four DWMAs, with at least one that is 1,000 mi^2, and incorporating the appropriate reserve design criteria given in Objective 1.3. This is not true for the BLM-only alternative. Although the alternative maintains the external, larger DWMA boundary, private lands are excluded, undermining the adequate DWMA size and configuration (i.e., lack of conservation on private land, checkerboard ownership pattern within the DWMA would undermine conservation efforts). Although Alternative E would result in the establishment of a single 1,000 mi^2 DWMA, it fails to meet Objectives 1.1 and 1.3. Alternatives F and G would fail to establish any DWMAs, and therefore would fail to meet any of the three criteria.

Goal 2: Establish an upward or stationary trend in the tortoise population of the West Mojave Recovery Unit for at least 25 years (see Table ES-2).

Objective 2.1: Achieve population growth rates (lamdas) within DWMAs of at least 1.0.
Objective 2.2: Attain a minimum average population density of 10 adult female tortoises per square mile within each DWMA.
Objective 2.3: Establish a program for tortoise population monitoring that would detect an increase, decrease, or stable trend in tortoise population densities, and include an information feedback loop that ensures that necessary changes would be made in management.

Table ES-2
Tortoise Biological Goal 2

BIOLOGICAL GOAL 2	SEVEN ALTERNATIVES UNDER CONSIDERATION						
OBJECTIVES	A	B	C	D	E	F	G
2.1 Achieve stable populations	Unk	Unk	Unk	Unk	No	No	No
2.2 Achieve 10 females/mi^2	Unk	Unk	Unk	Unk	No	No	No
2.3 Population monitoring	No	No	No	No	No	No	No

There are limited means of assessing the seven alternatives in their efficacy to meet Goal 2 and its objectives. Success would be measured in terms of the population s response to implementing proactive conservation programs identified in each alternative. Achieving stable populations and a certain density of tortoises per square mile is unknown for the first four alternatives. Although Alternative E would result in the establishment of a single DWMA, even if the objectives were met for so small an area, poor reserve design, including very high surface area to boundary ratio, would effectively undermine the efficacy of conservation. Failure to establish DWMAs under Alternatives F and G would exacerbate rather than facilitate attaining these objectives.

Unfortunately, the ability to realize Goal 2, for all alternatives, is hampered by the likelihood of catastrophic die-offs that could ultimately extirpate tortoises regardless of proactive conservation management. It would also appear that distance sampling, which is suggested as the means of monitoring the population, might fail in its ability to detect increases or decreases in the population. The methodology does fairly well to measure rapid declines in the population over a three to five year period, but would fail to detect gradual increases, which may take a dozen or more years to detect. The method would be better applied in above-average concentration areas, as a tool to detect die-offs; continuing to apply it in extirpation areas will result in low sample sizes, which would fail to meet the minimum sample size of 80 tortoises/stratum required by the methodology.

Goal 3: Ensure genetic connectivity among desert tortoise populations, both within the West Mojave Recovery Unit, and between this and other recovery units (see Table ES-3).

Objective 3.1: Delineate and maintain movement corridors between DWMAs, and with the Eastern Mojave Recovery Unit, the Eastern Colorado Recovery Unit, and the Northern Colorado Recovery Unit.
Objective 3.2: Ensure a minimum width of two miles for movement corridors, and include provisions for major highway crossings.

Table ES-3
Biological Goal 3

BIOLOGICAL GOAL 3	SEVEN ALTERNATIVES UNDER CONSIDERATION						
OBJECTIVES	A	B	C	D	E	F	G
3.1 Delineate movement corridors	No	No	No	No	No	No	No
3.1 Connectivity to eastern recovery unit	No	No	No	No	No	No	No
3.2 Minimum width for connectors	No	No	No	No	No	No	No

As indicated in the table, none of the objectives would be realized by any of the alternatives. However, one has to question the validity of the biological goal in the first place. For example the four critical habitat units designated by the USFWS and analogous DWMAs recommended by the recovery team were used to derive the current proposals, yet with the exception of a small part of the Superior-Cronese DWMA, which is contiguous with the Eastern Mojave Recovery Unit, there are no places where connectivity between conservation areas is possible.

Given highways, freeways, and the city of Barstow, there was never an opportunity to connect the Ord-Rodman DWMA with either of the western DWMAs. Connectivity between the three DWMAs to the west with the Pinto Mountain DWMA was never physically possible. Fort Irwin occupies most of the contiguous areas between the Western Mojave Recovery Unit and the Eastern Mojave Recovery Unit; 29 Palms Marine Corps Base occupies most of the contiguous boundary with the Northern Colorado Recovery Unit; and Joshua Tree National Park completely encompasses the mutual boundary between the Western Mojave and Eastern Colorado recovery units. Given that the Department of Defense and National Park Service manage these areas, respectively, there was never any opportunity for BLM to establish conservation areas in these

places to provide for connectivity. Even so, there are undeveloped (albeit severely degraded on military installations) habitats between areas in the West Mojave and recovery units to the east, which will allow for genetic transfer. National Park Service management, in combination with the BLM s Chuckwalla DWMA of the NECO Plan, provides for conserved and connected habitat to the Eastern Colorado Recovery Unit.

There is also the question of whether or not connectivity is appropriate in the West Mojave. Sign count data collected since 1998 revealed that there appears to be a spread of disease or some other mortality factor that may be facilitated by the connectivity suggested in the recovery plan. If these patterns are truly resulting from disease spread, one needs to question the validity of maintaining connectivity among conservation areas. Having the Ord-Rodman and Pinto Mountain DWMAs physically separated from the two western DWMAs may strengthen the conservation strategy because there is no connectivity and they may be less vulnerable to regional spread of disease.

That the alternatives fail to result in connectivity among the DWMAs and adjacent recovery units is not considered a serious flaw with any of the alternatives for the reasons given above. Although there is no connectivity between conservation areas, there are still habitats crossing these borders that will allow tortoises to pass unimpeded from one recovery unit to an adjacent one. It is strongly recommended that the new recovery team consider the issue of connectivity in light of the new information now available.

Goal 4: Reduce tortoise mortality resulting from interspecific (i.e., raven predation) and intraspecific (i.e., disease) conflicts that likely result from human-induced changes in the ecosystem processes (see Table ES-4).

Objective 4.1: Initiate proactive management programs addressing each conflict, to be implemented by each affected agency or jurisdiction.
Objective 4.2: Establish an environmental education program to facilitate public understanding and support for proactive management programs necessary to reduce tortoise mortality.
Objective 4.3: Continue research programs and monitoring programs that assess the relative importance of human activities and natural processes that affect desert tortoise populations.

Table ES-4
Tortoise Biological Goal 4

BIOLOGICAL GOAL 4	SEVEN ALTERNATIVES UNDER CONSIDERATION						
OBJECTIVES	A	B	C	D	E	F	G
4.1 Address each conflict	Yes	No	Yes	Yes	No	No	No
4.2 Establish education program	Yes	Yes	Yes	Yes	Yes	Yes	No
4.3 Continue research and monitoring	Yes	No	Yes	Yes	No	No	No

Alternative A, upon which Alternatives C and D are predicated, was specifically designed to address the 22 known or suspected threats to tortoises discussed in the recovery plan and recently summarized by Boarman (2002). Each program must be considered on its own merits,

but in general, Alternatives A, C, and D were designed with these threats in mind, and are intended to meet Objective 3.1. Their efficacy is susceptible to limited funding, public support, and many other factors that are not easily foreseeable or controlled.

Effective conservation must necessarily rely on cooperation among all land managers, and include both private and public lands. Alternative B would fail to implement Objective 3.1 for this reason. Alternative E could work to implement Objective 3.1 in the 1,000 mi^2 area, but its relatively small size and high area to edge ratio fatally flaws it as providing for regional tortoise conservation. The focus on disease and raven management is too narrow to allow Alternative F to accomplish the objective.

Establishing an education program is often touted as important to regional conservation plans yet is seldom realized or implemented. In spite of this ubiquitous problem, each of the alternatives (excepting Alternative G, No Action) proposes some form of enhanced education. For this objective to be realized, managers must take a different, proactive look at regional education, or the conservation strategy is likely to be undermined.

Research and monitoring (Objective 4.3) are strongly encouraged for Alternatives A, C, and D but are missing, or only partially applied (Alternative F), in the remaining alternatives. It is difficult (and questionable) to assign limited funds to continued research when there are numerous, costly conservation programs that need to be implemented. Monitoring is essential, but the efficacy of distance sampling to function as intended is questionable.

E.4.2 Mohave Ground Squirrel

Table ES-5 presents an overview of the likely success of each alternative in meeting the biological goals established by the West Mojave Plan for the threatened Mohave ground squirrel.

Table ES-5
Mohave Ground Squirrel Biological Goals

	Biological Goals Met or Not: comparisons among alternatives						
Goal 1. Ensure long-term protection of MGS habitat throughout the species range.							
Objectives for Goal 1	A	B	C	D	E	E	G
Upon Plan adoption, establish management areas for the long-term conservation of MGS habitat: **1.1a** Establish the MGS CA for the protection of unfragmented habitats outside military installations.	Yes	No	Yes	Yes	No	No	No
1.1b Establish BTAs to minimize indirect impacts of human development to the MGS CA	Yes	No	No	Yes	No	No	No
1.2 Allow for adjustments to the MGS CA boundary based on findings of scientific studies.	Yes	No	Yes	Yes	No	No	No
1.3 Implement appropriate actions to ensure the long-term protection of habitat in the MGS CA throughout the life of the Plan.	Yes	No	Yes	Yes	No	No	No
1.4 On a yearly basis, track the loss of MGS habitat resulting from Plan implementation.	Yes	Yes	Yes	Yes	Yes	Yes	No

	Biological Goals Met or Not: comparisons among alternatives						
1.5 Cooperate with military installations by sharing scientific information and reviewing management plans (INRMP, CLUMP, etc) to assist environmental managers in evaluating MGS habitat protection on the bases.	Yes	Yes	Yes	Yes	Yes	Yes	No
Goal 2. Ensure long-term viability of the MGS throughout its range.							
Objectives for Goal 2							
2.1 As per the mandate of the CDFG, minimize and fully mitigate the impacts of the Plan s authorized incidental take of the MGS throughout the life of the Plan.	Yes	No	Yes	Yes	No	No	No
2.2 Upon Plan adoption, initiate and conduct studies that would determine the following measurable biological parameters: (a) the regional status, (b) potential hot spots (refugia), (c) genetic variation throughout the range, and (d) the ecological requirements of the MGS.	Yes	No	Yes	Yes	No	No	No
2.3 Establish long-term study plots throughout the range and annually monitor their MGS populations. Fund continued monitoring in the Coso Range to provide baseline population data.	Yes	No	Yes	Yes	No	No	No
2.4 Use the biological and population data from Goal 2, Objectives 2 and 3 to modify the management prescriptions, as warranted, to ensure the long-term viability of the species.	Yes	No	Yes	Yes	No	No	No

The findings here are similar to those for the tortoise; Alternatives A, C, and D, with a few exceptions, would better realize MGS conservation than the other alternatives. The same flaws identified with Alternatives B, E, F, and G for the tortoise would apply to MGS conservation. Given that the species is only State-listed, Alternatives B and G would, for the most part, be the same.

E.4.3 Other Species

Table ES-6 presents a summary in comparative form of acres of habitat conserved, and acres available for incidental take, for each covered species addressed by the West Mojave Plan for each alternative.

Table ES-6
Acreage of Conservation and Incidental Take of Covered Species in Each Alternative.

	A PREFERRED		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Desert tortoise	1,477,630	See text for ITA	1,023,329	454,301 in DWMA. See text for ITA	1,514,847	See text for ITA	1,505,494	4,393 See text for ITA	715,424	4,393 in DWMA. See text for ITA	See text different approach		DTNA, Cat 1 habitat	Unk.
Mohave ground squirrel	1,701,947	See text for ITA	1,280,106	See text for ITA	1,701,947	See text for ITA	1,701,947	See text for ITA	1,701,947	See text for ITA	1,701,947	See text for ITA	0	Unk.
Alkali Mariposa Lily	Permanent = 3,500+ Isolated sites	40,861	0	40,861	Permanent = 3,500+ Isolated sites	40,861	Permanent = 3,500+ Isolated sites	40,861	Permanent = 3,500+ Isolated sites	40,861	Permanent = 3,500+ Isolated sites	40,861	0**	68,171
Barstow Woolly Sunflower	50,548+	50	17,682+	32,872	50,548+	50	50,548+	50	50,548+	50	50,548+	50	0	Unk., estimated at 32,872 +
Bats	All significant roosts	< 25 bats at any one site	All significant roosts	No t limited	All significant roosts	< 25 bats at any one site	All significant roosts	< 25 bats at any one site	All significant roosts	< 25 bats at any one site	All significant roosts	< 25 bats at any one site	Roosts gated on case-by-case basis	Unk.
Bendire s Thrasher*	132,497	3,973	132,497	3,973	132,497	3,973	132,497	3,973	132,497	3,973	132,497	3,973	106,710	29,760
Brown-crested flycatcher	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Big Morongo ACEC	Unk.
Burrowing owl	Unk.	No mortality. Limited.	Occurrences on BLM lands	No mortality. Limited.	Unk.	No mortality. Limited.	Unk.	No mortality. Limited.	Unk.	No mortality. Limited.	Unk.	No mortality. Limited.	0**	Unlimited
Carbonate Endemic Plants	5,169	Minimal	4,393	776	5,169	Minimal	5,169	Minimal	5,169	Minimal	5,169	Minimal	0	Unk.
Charlotte s phacelia	All known sites	50	30 of 37 sites	7 sites	All known sites	50	All known sites	50	All known sites	50	All known sites	50	30 of 37 sites	7 sites
Crucifixion thorn	All known sites	50	All known sites	50	All known sites	50	All known sites	50	All known sites	50	All known sites	50	0	Unk.
Desert cymopterus	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	0	Unk. Estimated at 14,343

	A **PREFERRED**		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Ferruginous hawk	Prevents and remedies electrocution threat	Unknown but minimized	Prevents and remedies electrocution threat on BLM lands	Potential electrocutions on private lands	Prevents and remedies electrocution threat	Minimized	Prevents and remedies electrocution threat	Minimized	Prevents and remedies electrocution threat	Minimized	Prevents and remedies electrocution threat	Minimized	Electrocution threat minimized for new power lines on BLM lands	Unk.
Golden eagle*	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	17,671 at Middle Knob. Prevents and remedies electrocution threat on BLM lands	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Electrocution threat minimized for new power lines on BLM lands	0
Gray vireo	15,954+	Unk.	4,393+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	0**	Unk.
Inyo California towhee	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)
Kelso Creek Monkeyflower*	1,870	50	1,870	Unk. Minimal	1,870	Unk. Minimal	1,870	Unk. Minimal	1,870	Unk. Minimal	1,870	Unk. Minimal	0**	Unk. Minimal
Kern buckwheat	All except <0.1	<0.1	Most occupied habitat	Estimated 5 acres	All except <0.1	<0.1	All except <0.1	<0.1	All except <0.1	<0.1	All except <0.1	<0.1	Unk.	Estimated 10 acres
Lane Mountain milkvetch	14,597	0	10,164	4,433	14,597	0	14,597	0	14,597	0	14,597	0	Unk.	4,433+
LeConte s thrasher	1,782,892	Unk.	1,392,984	Unk.	1,811,468	Unk.	1,782,892	Unk.	1,521,707	Unk.	48,804+	Unk.	48,804+	Unk.
Little San Bernardino Mountains gilia	All known drainages	50	Sites within JTNP	All other known drainages	All known drainages	50	All known drainages	50	All known drainages	50	All known drainages	50	Sites within JTNP	All other known drainages
Mojave fringe-toed lizard	42,865+	4 sites, see text	37,270	5,595+	42,865+	4 sites, see text	42,865+	4 sites, see text	42,865+	4 sites, see text	42,865+	4 sites, see text	0	Unk.
Mojave monkeyflower	57,087	Unk.	36,630	20,457	57,087	50	57,087	50	57,087	50	57,087	50	0	Unk.
Mojave River vole	All sites (conditional)	0	0	Unk	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	0**	Unk.

	A **PREFERRED**		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Mojave tarplant	All occupied habitat	50 (new locations)	All occupied habitat	Unk.	All occupied habitat	50 (new locations)	All occupied habitat	50 (new locations)	All occupied habitat	50 (new locations)	All occupied habitat	50 (new locations)	All occupied habitat	Unk.
Parish s alkali grass	All of single known site	0	0	Unk.	0	All of single known site	0	All of single known site	0	All of single known site	0	All of single known site	0	Unk.
Parish s phacelia	898	50	512	376	898	50	898	50	898	50	898	50	0	Unk.
Parish s popcorn flower	All of single known site	0	0	Unk.	All of single known site	0	All of single known site	0	All of single known site	0	All of single known site	0	Unk.	Unk.
Prairie falcon	20,495 at Middle Knob. Minimizes mining impacts.	0	17,671 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	Unk.
Red Rock poppy	All occupied habitat	50	All occupied habitat	Minimal	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	Most habitat	Unk.
Red Rock tarplant	All occupied habitat	50	All occupied habitat	Minimal	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	Most habitat	Unk.
Salt Springs checkerbloom	All of single known site	0	0	Unk.	All of single known site	0	All of single known site	0	All of single known site	0	All of single known site	0	0	Unk.
San Diego horned lizard	15,954+	Unk.	4,393+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	0**	Unk.
Shockley s rock-cress	5,169	0	4,393	776	5,169	0	5,169	0	5,169	0	5,169	0	4,393 but no added management	776
Short-joint beavertail cactus	10,785	50	0	All	10,785	50	10,785	50	10,785	50	10,785	50	Existing SEAs and 1,590 scattered BLM parcels	0**
Southwestern pond turtle	All known sites (conditional at some)	Unk.	Selected sites	Unk.	All known sites (conditional at some)	Unk.	All known sites (conditional at some)	Unk.	All known sites (conditional at some)	Unk.	All known sites (conditional at some)	Unk.	Selected sites	Unk.
Southwestern willow flycatcher	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Big Morongo ACEC	Unk.
Summer tanager	Mojave River sites (conditional)	Unk.	Selected sites	Unk.	Mojave River sites (conditional	Unk.	Mojave River sites (conditional	Unk.	Mojave River sites (conditional	Unk.	Mojave River sites (conditional	Unk.	Selected sites see text	Unk.
Triple-ribbed milkvetch	All known sites	0	Sites on public land	Unk.	All known sites	0	All known sites	0	All known sites	0	All known sites	0	Sites on public land	Unk.

	A PREFERRED		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Vermilion flycatcher	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Selected sites see text	Unk.
Western snowy plover	All known sites	0	All known sites	0	All known sites	0	All known sites	0	All known sites	0	All known sites	0	Most known sites	Unk.
White-margined beardtongue	All known sites	50	Most known sites	Unk.	All known sites	50	All known sites	50	All known sites	50	All known sites	50	0	Minimal
Yellow-eared pocket mouse	Unk	Unk	Selected ACECs	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Selected ACECs	Unk
Yellow warbler	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Selected sites see text	Unk.
Western yellow-billed cuckoo	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Unk.	Unk.
Yellow-breasted chat	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Mojave River sites (conditional)	0	Mojave River sites (conditional) 10,785 (Big Rock Creek))	0	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Selected sites see text	Unk.

See also Table 2-11. Unk. = Unknown.

* Acreages are for BLM managed lands only

** Los Angeles County may expand its SEA boundaries, providing some conservation for this species.

*** See text for potential conservation of the No Action Alternative. Continued review of projects under CEQA, by BLM in Category 1 habitat, and by FWS in occupied and critical habitat will result in some conservation by provision of compensation lands or set-asides.

CHAPTER ONE
INTRODUCTION

1.1 OVERVIEW

The West Mojave Plan (Plan) is a habitat conservation plan and federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS) and over 100 other sensitive plants and animals and the natural communities of which they are a part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (CESA and FESA, respectively).

The Plan is being prepared through the collaborative effort of cities, counties, state and federal agencies having jurisdiction over lands within the region. The Plan will allow streamlined project permitting at the local level, equitable sharing of costs among participants, and shared stewardship of biotic resources. The collaborators include:

- **Local Jurisdictions:** The cities of Adelanto, Barstow, California City, Hesperia, Lancaster, Palmdale, Ridgecrest, Twentynine Palms, and Victorville, and the towns of Apple Valley and Yucca Valley; the Counties of Inyo, Kern, Los Angeles and San Bernardino; and the Indian Wells Valley Water District.
- **State of California:** The California Department of Fish and Game and California Department of Transportation (Caltrans)
- **Federal:** The Bureau of Land Management and the United States Fish and Wildlife Service.

These agencies and local jurisdictions are cooperating with a variety of non-governmental organizations, including businesses, environmental organizations, user groups and others with a stake in the future management of the planning area, to develop the West Mojave Plan. Over 100 non-governmental organizations (NGO) have participated in this process. Representatives of the agencies, jurisdictions and NGOs comprise the West Mojave ***Supergroup***.

1.1.1 Site Location and Description

The 9,357,929-acre planning area is located to the north of the Los Angeles metropolitan area (See Maps 1-1 and 1-2 and Table 1-1). The Plan s conservation program applies to both public and private lands within this area. These lands include 3,263,874 acres of BLM-administered public lands, 3,029,230 acres of private lands and 102,168 acres of lands administered by the State of California. The Plan will be consistent with the integrated natural resource management plans that have been adopted for 2,667,445 acres of military lands, and with programs being implemented on nearly 300,000 acres of lands within Joshua Tree National Park.

Table 1-1
Land Ownership in Planning Area

LAND OWNERSHIP	APPROXIMATE ACRES	APPROXIMATE PERCENTAGE
Private Landowners		32
Counties and Cities	3,029,230	
State of California	102,168	1
State Lands Commission	71,059	
Department of Parks and Recreation	27,166	
Department of Fish and Game	3,943	
Federal Government		
Department of the Interior	3,556,730	37
National Park Service	292,689	
Bureau of Indian Affairs	167	
Bureau of Land Management	3,263,874	
Forest Service	2,356	
Department of Defense	2,667,445	29
TOTAL	9,357,929	100

1.1.2 Environmental Impact Statement

The West Mojave Plan is a major federal action that has attracted a high level of public interest and participation. The Bureau of Land Management (BLM) would adopt the Plan through amendment of its California Desert Conservation Area (CDCA) Plan and approval of other actions called for by the West Mojave Plan. To comply with the National Environmental Policy Act, preparation of an environmental impact statement is necessary, and must be completed prior to a BLM decision to approve and adopt the Plan s conservation strategy.

This Environmental Impact Report and Statement (EIR/S) is intended to serve as BLM s NEPA compliance document for the West Mojave Plan and CDCA Plan Amendment. It is a broad-scope analysis of a proposed habitat conservation plan and six other alternatives, including the No Action Alternative. All subsequent environmental analyses for land-use proposals in the planning area could be tiered to the EIR/S.

A Notice Of Intent To Prepare A West Mojave Plan and Environmental Impact Statement was published in the Federal Register on December 5, 1991. This Notice announced the holding of public scoping meetings in January 1992. Meetings were held at the following locations: Ridgecrest (January 6, 1991), Barstow (January 7, 1991), Twentynine Palms (January 8, 1991), Bakersfield (January 9, 1991), Victorville (January 13, 1991), Lancaster (January 14, 1991), and Riverside (January 15, 1991). These meetings initiated the West Mojave planning process.

A federal *Revised Notice of Intent to Prepare West Mojave Plan and Environmental Impact Statement* was published in the Federal Register in May 2002. This notice announced the holding of seven additional NEPA scoping meetings. Those meetings were held at the following

locations: Palmdale (June 26, 2002), San Bernardino (June 27, 2002), Victorville (June 28, 2002), Ridgecrest (July 1, 2002), Lone Pine (July 2, 2002), Pasadena (July 9, 2002) and Yucca Valley (July 10, 2002). At these meetings the suggested conservation strategy developed by the West Mojave Supergroup and its task groups was discussed and comments accepted. Comments received during scoping area available for public review at the BLM s California Desert District Office, Moreno Valley, California.

1.1.3 Program Environmental Impact Report

The County of San Bernardino and the City of Barstow are acting as co-lead agencies under the California Environmental Quality Act (CEQA) and are responsible for preparation of the portions of the document that pertain to state environmental review procedures. Because local jurisdictions may adopt the plan by enacting ordinances and/or amending land use plans, compliance with CEQA is required under California regarding actions taken by state agencies or local governments.

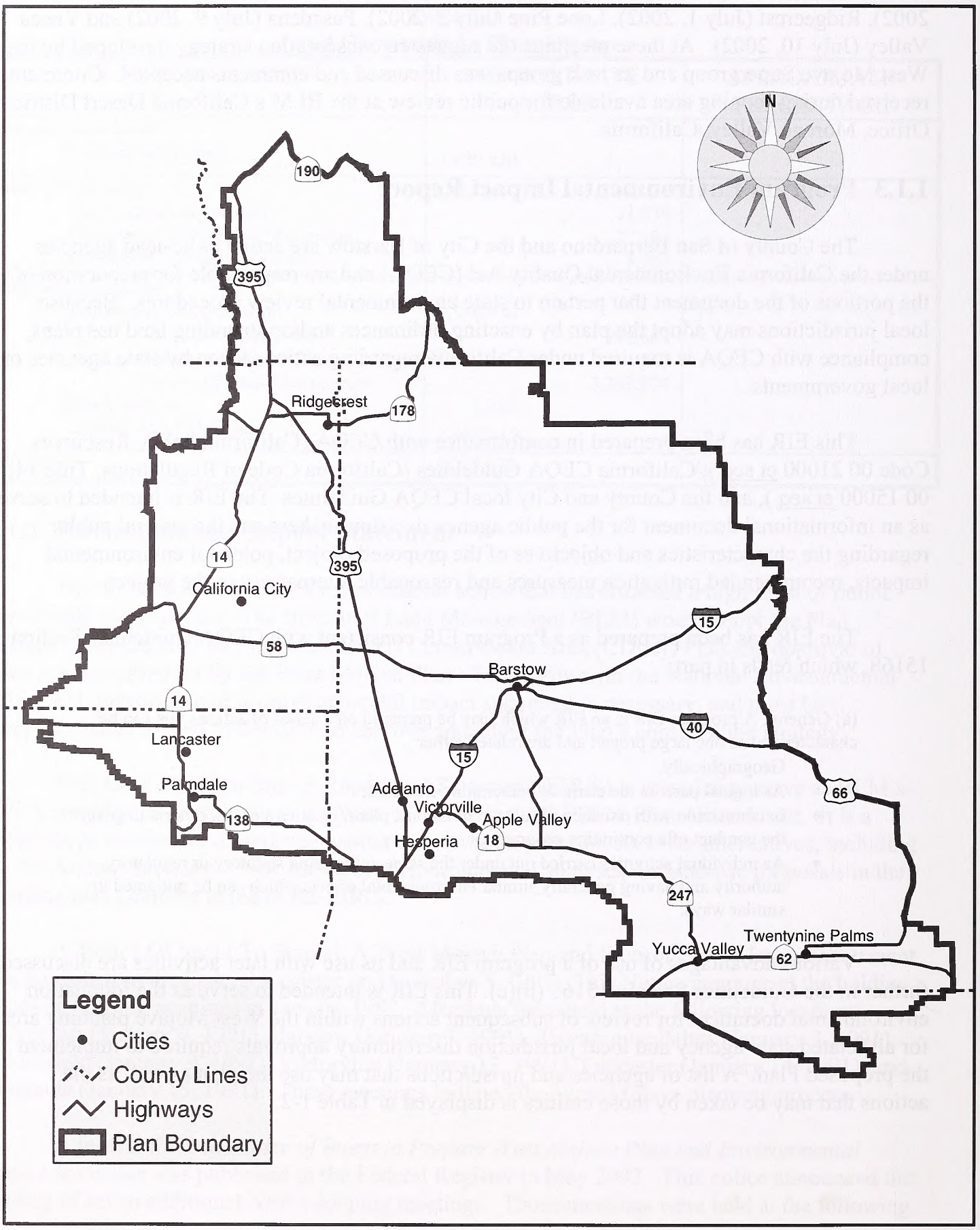
This EIR has been prepared in conformance with CEQA (California Public Resources Code 00 21000 et seq.), California CEQA Guidelines (California Code of Regulations, Title 14, 00 15000 et seq.), and the County and City local CEQA Guidelines. The EIR is intended to serve as an informational document for the public agency decision-makers and the general public regarding the characteristics and objectives of the proposed project, potential environmental impacts, recommended mitigation measures and reasonable alternatives to the project.

The EIR has been prepared as a Program EIR consistent with CEQA Guidelines Section 15168, which reads in part:

> (a) General. A program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either:
> - Geographically,
> - As logical parts in the chain of contemplated actions,
> - In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or
> - As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.

Various advantages of use of a program EIR and its use with later activities are discussed further in the Guidelines Section 15168 (b)(c). This EIR is intended to serve as the foundation environmental document for review of subsequent actions within the West Mojave planning area for all related state agency and local jurisdiction discretionary approvals required to implement the proposed Plan. A list of agencies and jurisdictions that may use the plan as well as the actions that may be taken by those entities is displayed in Table 1-2.

Planning Area



West Mojave Plan FEIR/S
Map 1-1

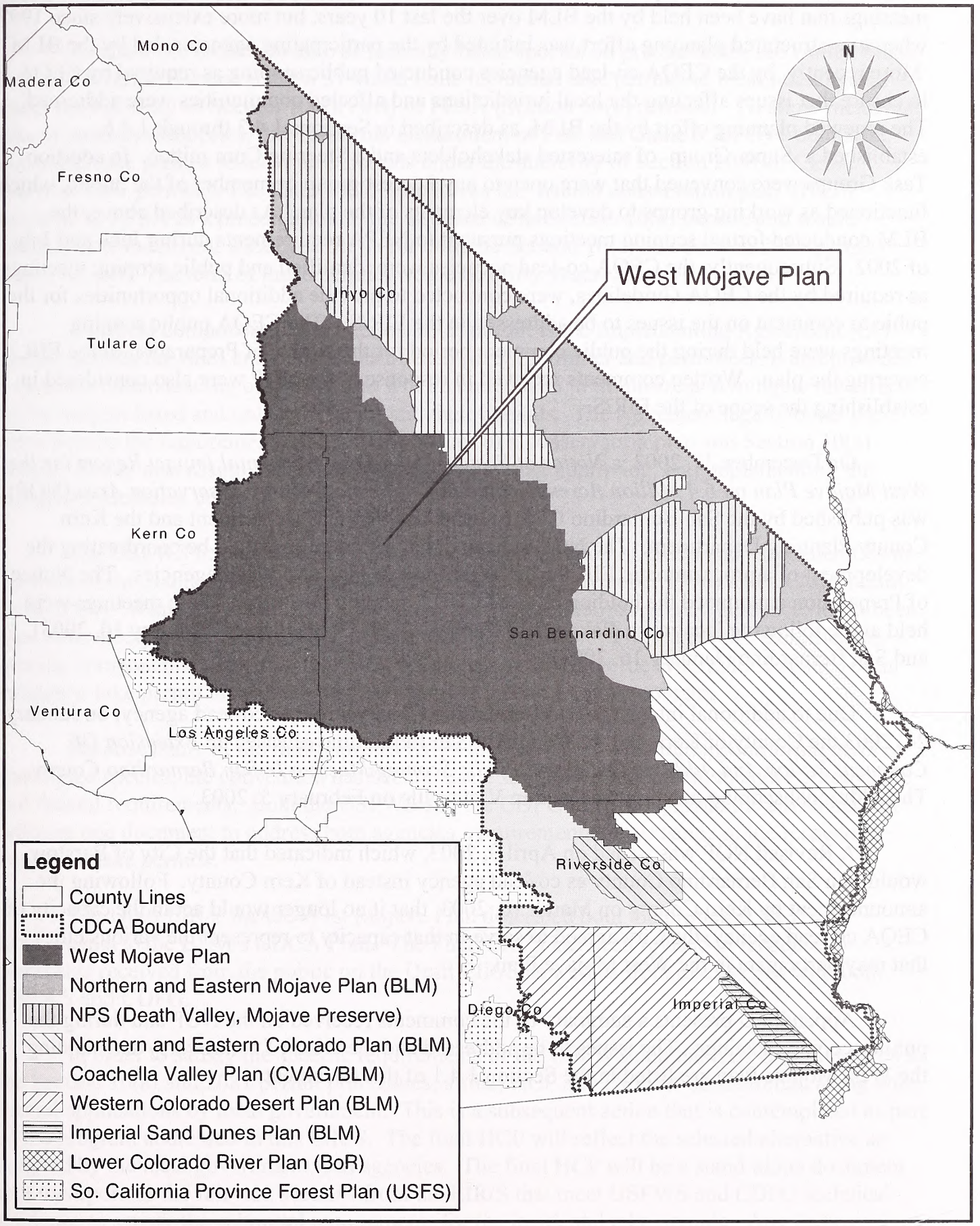
Scale: 1 : 1,750,000

0 10 20 30 Km

0 10 20 30 Miles

7/16/04

Regional Planning Efforts



West Mojave Plan FEIR/S
Map 1-2

Scale: 1 : 3,000,000

0 40 80 120 Km

0 20 40 60 Miles

7/30/04

Scope of the EIR: The scope of the EIR has been established through the various public meetings that have been held by the BLM over the last 10 years, but more extensively since 1997 when a re-structured planning effort was initiated by the participating agencies, led by the BLM. More recently, by the CEQA co-lead agencies conducted public scoping as required by CEQA to ensure that issues affecting the local jurisdictions and affected communities were addressed. The renewed planning effort by the BLM, as described in Sections 1.4.3 through 1.4.6, established a Super Group of interested stakeholders and a Steering Com mittee. In addition, Task Groups were convened that were open to any interest group or member of the public, which functioned as working groups to develop key elements of the plan. As described above, the BLM conducted formal scoping meetings pursuant to NEPA requirements during June and July of 2002. Subsequently, the CEQA co-lead agencies were identified and public scoping meetings as required by the CEQA Guidelines, were conducted to provide additional opportunities for the pubic to comment on the issues to be addressed in the EIR/S. The CEQA public scoping meetings were held during the public comment period for the Notice of Preparation of the EIR covering the plan. Written comments received in response to the NOP were also considered in establishing the scope of the EIR/S.

On December 27, 2002, a *Notice of Preparation of Environmental Impact Report for the West Mojave Plan on 6.4 Million Acres Located In California Desert Conservation Area* (NOP) was published by the San Bernardino County Land Use Services Department and the Kern County Planning Department. The NOP indicated that the counties would be coordinating the development of a programmatic EIR for the West Mojave Plan as co-lead agencies. The Notice of Preparation announced the holding of three CEQA scoping meetings. These meetings were held at the following locations: Bakersfield (January 9, 2003), Ridgecrest (January 10, 2003), and San Bernardino (January 16, 2003).

Due to additional interest in San Bernardino County s role as co-lead agency, on January 24, 2003 the County of Kern and the County of San Bernardino released an *Extension Of Comment Period And Addition Of Second Public Scoping Meeting In San Bernardino County.* The additional scoping meeting was held in Victorville on February 5, 2003.

A Revised NOP was issued on April 9, 2003, which indicated that the City of Barstow would join San Bernardino County as co-lead agency instead of Kern County. Following the announcement by Kern County on March 10, 2003, that it no longer would act in the capacity of CEQA co-lead agency, the City agreed to serve in that capacity to represent the various cities that may participate in the West Mojave Plan.

Appendix U presents a summary of the comments received on the NOP and during the public scoping meetings. The issues to be addressed and the areas of controversy surrounding the West Mojave Plan are listed in the Section 1.4.1 of this document.

1.1.4 Incidental Take Permits

To allow the incidental take of federally listed species on private lands, the United States Fish and Wildlife Service (USFWS) would issue incidental take permits to local jurisdictions under the authority of Section 10(a)(1)(B) of FESA (Section 10(a) permits). To allow incidental take of state-listed species, the California Department of Fish and Game (CDFG) would issue incidental take permits to local jurisdictions under the authority of Section 2081 of CESA (Section 2081 permits). The Plan would function as the habitat conservation plan (HCP) required by FESA as a precondition to the issuance of its Section 10(a) permit, and would indicate how the permit issuance criteria for both the Section 10(a) and Section 2081 permits would be met. The term of those permits would be thirty years.

A critical component of the Section 10(a) permit is the Implementing Agreement (IA). The IA defines the roles and obligations of each party (permitter and permittee(s)) and provides a common understanding of actions that will be undertaken to minimize and mitigate the effects on the subject listed and unlisted species and their habitats. The agreement legally binds the permittees to the requirements and responsibilities of a conservation plan and Section 10(a) permit. It may also assign the responsibility for planning, approving, and implementing the mitigation measures under the HCP.

The USFWS has established guidance on the preparation of HCPs and associated IAs in the form of the Habitat Conservation Planning Handbook (November 1996) and an Addendum (June 2000). While the Handbook is intended primarily as internal agency guidance, it has been used extensively by entities seeking an Incidental Take Permit. The Handbook identifies the specific components of an HCP that must be addressed to satisfy the criteria for issuance of an incidental take permit along with the key elements that an IA must contain.

Because many of the multi-species HCPs that have been prepared in California involve state listed species, the convention has been to use a single HCP document to address both state and federal requirements. Both the USFWS and the CDFG have recognized the advantages of utilizing one document to address both agencies requirements for issuance of the respective incidental take permits.

The Draft EIR/S for the West Mojave Plan described both the proposed HCP and amendments to the BLM s CDCA Plan. The Final EIR/S has been revised in response to comments received from the public on the Draft EIR/S as well as from discussions with both USFWS and CDFG.

In order to satisfy the specific requirements of the USFWS and the CDFG with regards to the Section 10(a) and 2081 permit procedures, a final HCP and IA must be submitted along with formal applications by local government. This is a subsequent action that is contemplated as part of the program addressed in this EIR/S. The final HCP will reflect the selected alternative as adopted by the local government lead agencies. The final HCP will be a stand-alone document that incorporates the relevant sections from the EIR/S that meet USFWS and CDFG technical guidance to satisfy the submittal requirements for the incidental take permits. Any further

environmental review associated with incidental take permit procedures will comply with the requirements of NEPA and CEQA.

1.1.5 EIR/S Organization

The EIR/S is organized into the following parts:

- **Chapter One - Introduction** provides an overview of the Plan, the reasons for its preparation, applicable statutes, regulations, and policies, and the history of the planning process.
- **Chapter Two - Alternatives** describes the seven alternative conservation strategies examined in detail by this document. A tabular comparison of these alternatives is provided. This chapter also describes other suggested strategies that were discussed during the planning process but ultimately eliminated from detailed consideration by the EIR/S.
- **Chapter Three - Affected Environment** describes those aspects of the natural and human environment that are likely to be affected by the adoption of the alternatives described in Chapter 2. These include the region s biological, recreation and cultural resources, a social and economic profile of the western Mojave Desert, energy production and transmission, and a discussion of motorized vehicle access to public lands.
- **Chapter Four - Environmental Consequences** presents an analysis of the effects that adoption of each of the alternatives could have on the natural and human environment.
- **Chapter Five** addresses the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity, irreversible and irretrievable commitments of resources, growth inducing effects, energy consumption and conservation, environmental justice considerations, and effects found not to be significant. It includes references cited, a list of preparers and a table of acronyms.
- **Chapter Six** presents a summary of comments received during the scoping process.
- **Appendices** that include supporting technical materials and studies.

1.1.6 Use of EIR/S by Agencies and Jurisdictions

The EIR/S would be used by many of the collaborating agencies and local jurisdictions in making decisions concerning the West Mojave Plan. These entities are listed in Table 1-2 along with the possible uses of the EIR. Public agencies (i.e., Responsible and Trustee Agencies) that may use this EIR in their decision-making or permit processing, will consider the information in this EIR along with other information that may be presented during the CEQA process. The role of a state or local public entity acting as a responsible agency under CEQA is described in Section 15096 of the CEQA Guidelines.

Table 1-2
Agencies and Jurisdictions Expected to use EIR/S During Decision-making Process

AGENCY/JURISDICTION	STATUS	POTENTIAL USE(S) OF THE EIR/S
Bureau of Land Management	NEPA Lead Agency	CDCA Amendment
San Bernardino County	CEQA Co-Lead Agency NEPA Cooperating Agency	Plan adoption and other implementing actions
Kern County	CEQA Responsible Agency NEPA Cooperating Agency	Plan adoption and other implementing actions
Inyo County	CEQA Responsible Agency	Plan adoption and other implementing actions
Los Angeles County	CEQA Responsible Agency	Plan adoption and other implementing actions
Fish and Wildlife Service	NEPA Cooperating Agency	Section 7 Consultation & Section 10a(1B) Permit
California Department of Fish and Game	CEQA Responsible and Trustee Agency	Incidental Take Permit per Section 2081
Caltrans	CEQA Responsible Agency	Plan adoption and other implementing actions
Adelanto	CEQA Responsible Agency	Plan adoption and other implementing actions
Apple Valley	CEQA Responsible Agency	Plan adoption and other implementing actions
Barstow	CEQA Co-Lead Agency	Plan adoption and other implementing actions
California City	CEQA Responsible Agency	Plan adoption and other implementing actions
Hesperia	CEQA Responsible Agency	Plan adoption and other implementing actions
Lancaster	CEQA Responsible Agency	Plan adoption and other implementing actions
Palmdale	CEQA Responsible Agency	Plan adoption and other implementing actions
Ridgecrest	CEQA Responsible Agency	Plan adoption and other implementing actions
Twentynine Palms	CEQA Responsible Agency	Plan adoption and other implementing actions
Victorville	CEQA Responsible Agency	Plan adoption and other implementing actions
Yucca Valley	CEQA Responsible Agency	Plan adoption and other implementing actions
Indian Wells Valley Water District	CEQA Responsible Agency	Adopt Plan

Per CEQA, the term responsible agency includes all public agencies other than the lead agency having discretionary approval power over the project. Responsible Agency means a public agency that proposes to carry out or approve a project, for which a lead agency is preparing or has prepared an EIR or negative declaration. Trustee Agency means a state agency having jurisdiction by law over natural resources affected by the project that are held in trust for the people of California. Per NEPA, cooperating agency m eans an agency (including, by agreement, a local agency) having jurisdiction by law or special expertise with respect to any environmental impact involved in a major federal action.

1.1.7 Modifications to be Found in the Final EIR/S

Responses to comments received on the Draft EIR/S are presented in Chapter 6. Many of the comments requested modifications or clarifications of either the West Mojave Plan s conservation strategy or the environmental analysis presented in the Draft EIR/S. Where the text of the Final EIR/S differs from that presented in the Draft EIR/S, a vertical black line in the left-hand margin indicates the location of the modified or clarified text. A summary of these modifications follows. Because most of the changes consisted of minor modifications, only a selection is presented below.

- Conservation Area adjustments
  - Pisgah Crater (western portion dropped, expansion to northeast)
  - North Edwards (some lands excluded)
  - Alkali Mariposa Lily (realigned to capture the Amargosa Creek drainage, increase size and drop interim conservation areas)
- Biological Transition Areas eliminated (portions added to DWMA)
- New biological objectives for several species
- Tortoise Survey Zones minor modifications
- Fee Zones minor modifications
- BLM DWMA Multiple Use Class M Lands changed to Class L
- Revised Monitoring and Adaptive Management Table
- Additional discussion of cumulative impacts
- Appendix C.1 (Implementation Tasks, Costs and Priorities) Revision
- Compact Disk Additions species accounts, vegetation map, Draft EIR/S comment letters
- BLM Route Designation
  - Adoption of Competitive C Routes Northwest of Spangler Open Area
  - Route Openings in Summit Range
  - Route closures in Fremont Kramer Tortoise DWMA to Offset C Routes
  - Selected closures in small conservation areas
  - Revised Juniper Subregion route network
  - No Action route network is BLM June 30, 2003 Decision Record

1.2 PURPOSE AND NEED

The West Mojave planning area is rich in biological diversity because of its varied vegetation communities and landforms and because of its location adjacent to the Transverse Ranges, the Sierra Nevada, the Colorado Desert and the Great Basin. With its proximity to the rapidly growing cities of the Los Angeles basin, the West Mojave planning area is subject to increasing demand for community development, recreation and resource utilization. One result is an increasing loss of species habitat.

Loss or degradation of species habitat along and beyond the urban interface can lead to the listing of plants and animals as threatened or endangered by the USFWS and/or the CDFG.

USFWS has listed thirteen western Mojave species; CDFG has listed eleven; six are listed by both agencies (see Table 1-3). It was the listing of the desert tortoise by USFWS and CDFG in 1990 and 1989, respectively, that was the impetus for the preparation of the West Mojave Plan. Several dozen other plants and animals are at risk of listing in the next few decades, unless proactive conservation steps are taken.

Table 1-3
Special Status Species Summary

CATEGORY	LISTED	PROPOSED	OTHER	TOTAL
Fish	1	0	0	1
Amphibians	3	0	0	3
Reptiles	1	0	4	5
Birds	7	0	30	37
Mammals	1	0	13	14
Plants	8	0	55	63
TOTAL	21	0	102	123

Because species are interdependent, the steps necessary to conserve species cannot be taken in isolation. Species exist naturally as members of a network of varying connections to other species and their habitats. The inherent interdependence of species and ecosystems makes it difficult to protect any given plant or animal without taking into account factors that may apply to many species. Both species and natural communities must be considered.

Once a species is listed, federal agencies such as the BLM are required to ensure that declining populations *recover* to levels sufficient to ensure their long-term survival. Any new development project on public lands that may affect a listed species can proceed only after the agency consults with USFW S and receives a biological opinion finding that the project would not jeopardize the continued existence of the species in the wild. Once recovery is attained, the species can be delisted.

CESA and FESA impose special requirements on private lands as well. In most cases, persons may not *take* a species listed as threatened or endangered. This protection extends to the listed species habitat. Take is permitted, however, if a landowner obtains an incidental take permit. Such permits are required from the agency that listed the species (USFWS and/or CDFG). Obtaining these permits can be a time-consuming and expensive process. Permitting delays will only increase if unattended biological problems lead to more species being listed.

This situation has led to two unmet needs, for: (1) a regional biological strategy to conserve plant and animal species and their habitats and prevent future listings; and (2) an efficient, equitable and cost-effective process for complying with threatened and endangered species laws.

The purpose of the West Mojave Plan is to satisfy both of these needs. The Plan includes a conservation strategy which would allow state and federal land management agencies to implement their mandates under FESA and CESA to recover listed species and their habitats,

and to conserve natural communities. At the same time, it proposes a streamlined program which would significantly reduce the time and expense involved in obtaining biological opinions and incidental take permits.

1.3 RELATIONSHIP BETWEEN THE WEST MOJAVE PLAN AND THE EXPANSION OF FORT IRWIN

The National Training Center at Fort Irwin provides a battlefield environment for training brigade-sized units of the United States Army. It is the Department of the Army s premier combat training center. Due to changes in technology and tactics, the Army has sought to include additional lands within the boundaries of the installation to enable it to conduct training that meets the future combat needs of the Army. To this end, the Army has been examining possible base expansion scenarios for more than a decade.

In December 1996 the BLM, as lead federal agency due to its role as administrator of public lands likely to be included in any base expansion, published a draft Environmental Impact Statement titled Army s Land Acquisition Project for the National Training Center, Fort Irwin California, and Proposed Amendment to the California Desert Conservation Area Plan. The DEIS examined several potential alternative base expansion scenarios, and was released for a 90-day public review.

In December 2001, Congress enacted the Fort Irwin Military Land Withdrawal Act. This statute withdrew approximately 110,000 acres of public lands adjacent to Fort Irwin and transferred jurisdiction from BLM to the Army. While the purpose of the transfer was to provide the lands necessary for expanded training at Fort Irwin, the Army was precluded from using the lands for that purpose until it completed the steps necessary to comply with NEPA and the federal endangered species act. Completion of these steps will require the preparation of a supplemental draft EIS (SDEIS) and a final EIS, and a Section 7 consultation with USFWS. Fort Irwin has assumed federal lead responsibility for preparation of the base expansion SDEIS, because the critical NEPA question has become the use of these lands by Army rather than their transfer to Army. The supplemental draft EIS was published in April 2004.

The Fort Irwin Military Land Withdrawal Act requires that the analysis [of the Fort Irwin base expansion] shall be coordinated, to the extent practicable and appropriate, with the review of the West Mojave Coordinated Management Plan that, as of the date of the enactment of this Act, is being undertaken by the Bureau of Land Management. Accordingly, the preparation of this final EIR/S has been coordinated with the Army s base expansion planning team so that the information presented in each document is consistent and the potential and cumulative impacts of the projects are adequately addressed.

1.4 HISTORY OF THE PLANNING PROCESS

1.4.1 Planning Issues

The issues to be addressed by the West Mojave Plan have been identified through a ten-year public involvement process that began with a first round of scoping meetings (held in January 1992), increasingly frequent Supergroup meetings, several dozen meetings of task groups established by the Supergroup between December 1999 and May 2002, a final round of NEPA scoping meetings held in June and July 2002, and most recently concluding with CEQA scoping meetings held in January and February 2003 and an opportunity to comment on the Notice of Preparation for the EIR. A summary of the most important issues is presented in Table 1-4.

Table 1-4
Planning Issues

ISSUE	DISCUSSION
Desert Tortoise	Identify conservation areas and adopt conservation strategies that minimize take on private land and recover populations on public land.
Mohave Ground Squirrel	Identify conservation areas and adopt conservation strategies that minimize take on private land and recover populations on public land.
Other Listed and Sensitive Species	Adopt conservation strategies that minimize take on private land, recover populations on public land, and prevent future listings of unlisted species.
Streamlined Endangered Species Act Compliance	Develop a streamlined process that would allow applicants for city, county, state and federal permits and authorizations to accelerate existing costly and time-consuming permit issuance procedures.
Motorized Vehicle Access Network for Public Lands	Provide appropriate motorized vehicle access to public lands for commercial, recreational and other purposes in a manner that is compatible with species conservation.
Expansion of Fort Irwin	Develop conservation strategies that will be effective even if expanded military training programs are implemented on lands transferred in 2001 to Fort Irwin.
Standards and Guidelines for Public Lands	Develop rangeland standards for managing ecosystem health and guidelines for managing domestic livestock uses.
Regional Economic Growth	Promote economic growth within the planning area.

1.4.2 1992 Memorandum of Understanding

The West Mojave planning process was formally initiated in 1992 by the execution of a *Memorandum of Understanding By and Between the U.S. Bureau of Land Management and the Undersigned Participating Agencies* (MOU; see Appendix A). Recognizing that CESA and FESA direct the parties to protect certain species of concern and their habitats from adverse effects resulting from public and private development and actions and acknowledging that the private sector cannot now be assured that project review will be timely or that mitigation, compensation, and other requirements will be consistent among the participating agencies (MOU, page 1), the MOU identified the following Purposes of the Plan :

1. Protection of Species of Concern: To conserve and protect species of concern and the ecosystem on which they depend within the western Mojave Desert.

2. Provide Equity in Regulation: To provide a comprehensive means to coordinate and standardize mitigation and compensation requirements so that public and private actions will be regulated equally and consistently, reducing delays, expenses, and regulatory duplication. It is intended that the Plan will eliminate uncertainty in developing private projects and will prescribe a system to ensure that the costs of compensation/mitigation are applied equitably to all agencies and parties.

3. Reduce Cumulative Impacts: To prescribe mitigation measures for private development and agency actions to lessen or avoid cumulative impacts to the species of concern and eliminate, whenever possible, case-by-case review of impacts of projects when consistent with the mitigation and compensation requirements prescribed by the Plan. [MOU, page 2]

The MOU provided that the Plan will function as the Habitat Conservation Plan for the [incidental take] permit applications by participating local governments.

1.4.3 1997 Equitable Precepts

In mid-1997 the participating agencies, led by the BLM, restructured the planning process to ensure (1) greater public participation in developing a conservation strategy that would meet the needs of the participants, and (2) collection and use of the best science reasonably available, including recent field surveys. As a first step in this restructuring, on September 10, 1997, the West Mojave Supergroup adopted Equitable Precepts to guide the preparation of the West Mojave Plan. These consisted of the Mission Statement and Principles set forth below:

Mission Statement

The West Mojave Plan will provide an improved and streamlined process which minimizes the need for individual consultations with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) while providing better science for species conservation.

The [West Mojave] Plan will allow projects to be approved and signed-off rapidly. Project proponents will know the mitigation measures that will be required of them before the project is presented to the local government or, in the case of public land, presented to the state or federal agency.

Principles

1. The ultimate goal of the [West Mojave] Plan will be based on specified measures to enable project proponents to comply with the requirements of CESA and FESA.

2. The [West Mojave] Plan will be equitable, predictable and compatible with local, state and federal agency permitting procedures so as to be easily administered.

3. The mitigation strategy will be responsive to the needs and unique characteristics of the many diverse industries and activities in the program area on both public and private land while allowing compatible growth.

4. Project proponents shall have a choice of utilizing the conservation program or working

directly with the CDFG or USFWS to address Endangered Species Act compliance.

5. The [West Mojave] Plan will incorporate realistic fiscal considerations, with identified sources, i.e. federal, state, local, public and private.

6. The [West Mojave] Plan will ensure that no one group of desert users will be singled out to disproportionately bear the burden of the [West Mojave] Plan implementation.

7. The [West Mojave] Plan will have the flexibility to respond to future legislative, regulatory and judicial requirements.

1.4.4 Data Base

The West Mojave Plan is based upon the best science reasonably available. To meet this standard, data were reviewed to identify pertinent life history information, assess threats to covered species, and provide the most appropriate management prescriptions to address those threats. Where existing information was considered incomplete, species experts were consulted to fill in the data gaps. The planning team consulted 8 botanists, 13 ornithologists, 3 mammalogists, and 4 herpetologists to ensure that data for those taxa were the most complete and accurate information available. For the desert tortoise, this meant collecting and digitizing existing transect data and performing new surveys over approximately 3,615 square miles that had not been recently surveyed. Previous planning for Mohave ground squirrel conservation (Remple 1991, Clark 1993) and recent studies (Leitner and Leitner 1989, 1990, 1996a, 1996b; Leitner et al. 1995, 1997) were important for designing reserves and determining appropriate management prescriptions. New field surveys were conducted in the spring of 2001 for sensitive birds and plants.[1]

Biological data for the Plan were obtained from a variety of sources. The data were compiled, analyzed, and stored to support various components of the Plan preparation and implementation process. The sources of data include known location information for covered species and habitats. These data were complied from various sources, including the following:

- California Natural Diversity Data Base (NDDB) records. Data from the NDDB were from 1999 and have been updated periodically since then.
- CDFG, BLM, Army and USFWS data.
- Data collected from biologists knowledgeable about the plan area and/or a given species. This included records from consultants and non-profit organizations (e.g. California Native Plant Society, Point Reyes Bird Observatory, Mojave Desert Bird Club).
- Data from individual biologists obtained during planning meetings.
- Location data from voucher specimens held in museums and herbaria.
- Published records and species distribution information from peer-reviewed journal articles, where information on species has been described at an appropriate scale.
- Presence-absence tortoise survey data resulting from studies required by county and local government since the 1990 listing.

1 See Chapter 3 for a more detailed discussion of these data.

Dr. William Boarman prepared a survey of the threats adversely affecting the desert tortoise for the West Mojave planning effort. This was the peer-reviewed *Threats to the Desert Tortoise: A Critical Review of the Scientific Literature* (attached as Appendix J). Dr. Boarman s threats analysis was instrumental in identifying potential conservation measures to address each known threat adversely affecting the tortoise.

Species Accounts: For each plant or animal addressed by the Plan, a *Species Account* was prepared. A wildlife biologist or botanist possessing recognized expertise concerning the species in question authored each of these documents. The accounts described the general status, habitat, life history, distribution, biological goals, and threats faced by each species, as well as a detailed bibliography. All species accounts were peer reviewed. GIS maps were created for each species showing known occurrences and general distribution, and all cited papers and reports were obtained and copies filed.

Current Management Situation: In March 1999, a report was published detailing the *Current Management Situation of Special Status Species in the West Mojave Planning Area* (CMS). This report identified existing policies and management actions being applied by each of the participating agencies with respect to each of the species being addressed by the Plan.

Geographic Information System Database: A digital library of over 300 geographic data layers was assembled, displaying biological, political, topographic and other critical planning information.

Motorized Vehicle Access Network Field Survey: Between September 2001 and March 2002, thirteen field crews inventoried nearly 8,000 miles of motorized vehicle access routes within the western Mojave Desert. Both four wheel drive and motorcycle crews participated in the survey. Routes were recorded using global positioning system technology. The nature of the route (graded gravel, good dirt, motorcycle trail) was recorded, and nearly two-dozen types of pertinent desert features mapped (including campsites, mines, trailheads, and water sources). This information was transferred into the planning team s digital GIS library. In addition, data collected by BLM field survey crews in 1985 and 1987, and during the preparation of BLM management plans for areas of critical environmental concern between 1980 and the late 1990s, was digitized and stored in the GIS database. This data was supplemented by data digitally collected from aerial photography taken in 1995 and 1996, and covering most public lands within the planning area.

In response the many comments on the Juniper subregion, an inventory of existing routes of travel was performed in October 2003. Using this new database, comment clarification letters and comments at three meetings held to discuss this subregion, BLM revised the route designations in the Juniper subregion to provide a more accurate and effective transportation network.

Development of the List of Species Addressed by the Plan: The list of species to be addressed by the Plan was based on wildlife agency compilations of threatened, endangered, vulnerable, and declining species. Species addressed by the plan include both those for which

private land incidental take permit coverage would be sought (covered species), and those for which a public land conservation strategy would be adopted and implemented by the BLM through its California Desert Conservation Area Plan.

Criteria for inclusion on the list included the following:

- Species listed as threatened or endangered by the state and federal governments.
- Species proposed for listing by the federal government.
- Species designated as candidates for listing by the state and federal government.
- Species of Special Concern on the Departm ent s Special Anim als list.
- Plants included on the Department s Special Plants list.
- Plants and animals on the BLM sensitive species list.
- Plants included on List 1B or List 2 of the California Native Plant Society s *Inventory of Rare and Endangered Plants of California*.

The Supergroup approved the list of 98 plant and animal species to be addressed by the Plan in 1996. The USGS then contracted with experts on each species, who prepared the species accounts for use in development of the Plan.

On May 5, 1997 and April 3, 1998, local botanists submitted a list of plants and animals seen at Middle Knob and in surrounding areas. These records were examined, and those species found within the West Mojave Plan area were included. On September 1 1998, the California Native Plan Society submitted a list of fourteen rare plants within the West Mojave and requested their addition to the Plan list. This list was reviewed and species with sufficient information were added to the list of species to be addressed by the West Mojave Plan.

The *Current Management Situation of Special Status Species in the West Mojave Planning Area* was published March 31, 1999. This document detailed existing conservation measures in place for each jurisdiction for each of the original 98 species.

Using the species accounts and the *Current Management Situation*, West Mojave Plan biologists met with the wildlife agencies to prepare an evaluation. The evaluation team reviewed all species on the Supergroup list along with the proposed additions. Fifty-eight species were dropped from the list and were not further addressed by the Plan because of insufficient data, because they were being separately addressed by other Habitat Conservation Plans and Biological Opinions already in place or underway, because they were too common, or for other reasons. The Evaluation Report of September 22, 1998 discussed the reasons for retention or deletion of species from the covered species list.

Changes were made in the federal, state and CNPS lists between 1998 and now. The *Inventory of Rare and Endangered Plans of California* was revised in August 2001, and plants that were added to List 1B and List 2 were added to the West Mojave list if sufficient information was available to prepare conservation plans. Plants that were deleted from the earlier edition were deleted from the West Mojave list. Similarly, CDFG s list of Special Animals changed over tim e, and these changes were incorporated into the West Mojave list.

The final list of species was completed on June 26, 2002. This list was provided to members of the Task Groups and Supergroup and all interested stakeholders. As this list was reviewed by the local jurisdictions, a few additional changes were made, such as deletion of Kelso Creek monkeyflower, mountain plover and Bendire s thrasher from the request for incidental take coverage.

In response to comments on the West Mojave Plan, other species were deleted from the request for incidental take coverage. Concerns expressed by CDFG resulted in deletion of nine species because of insufficient information or for other reasons. These are bighorn sheep, spotted bat, pallid bat, long-legged myotis, Western mastiff bat, golden eagle, Panamint alligator lizard, Reveal s buckwheat, and flax-like monardella.

The Plan now lists 49 species as covered species proposed for receipt of incidental take permits under the Section 10(a) and 2081 permits. Wildlife agency review of this document and the Implementing Agreement may result in the exclusion of other species from permit coverage. The list of all species addressed by the Plan, along with the scientific names, is included as Appendix Y.

1.4.5 Biological Evaluation

Following the assembly of the database, a Biological Evaluation was conducted in a series of meetings between March 1998 and June 2000. Participants included biologists from the West Mojave planning team, USFWS, CDFG and invited experts. Biologists evaluated the effectiveness of current management, identified management shortfalls, and suggested measures to address those shortfalls. Evaluation meetings were structured around the following seven questions:

- How important is the planning area to the species as a whole?
- Does the planning area contain essential habitat for the species to complete its life history?
- Why was the species placed on the special status list? What is the concern?
- Is current management adequate to protect the species?
- Is the geographical size and location of conservation areas adequate to protect the species? If not, what additional areas need to be committed to assure protection of the species?
- Is the management of proposed conservation areas adequate to protect the species? If not, what management improvements could be implemented to assure protection of the species within the target conservation areas?
- Is management of lands outside conservation areas adequate to protect the species? If not, what management improvements could be implemented to assure protection of the species outside conservation areas?

An Evaluation Report addressing the Desert Tortoise, mammals, birds, fish, reptiles and amphibians was published on September 22, 1999 and distributed to the Supergroup. A Mohave

ground squirrel Evaluation Report was completed and distributed on September 14, 2000. Finally, an Evaluation Report addressing rare plants was completed and distributed on October 15, 2001.

1.4.6 Task Groups Develop the Conservation Strategy

In November 1999, the West Mojave Supergroup established four task groups to develop components of the West Mojave Plan. Task group members were not appointed; rather, any organization or individual could attend and participate in a task group meeting. All meetings were open to the public and, at one time or another, a representative of nearly every Supergroup entity attended a task group session. Task groups were not established to make decisions for the participating agencies and jurisdictions, nor were they intended to function as formal appointed advisory bodies. Rather, the task groups provided an informal public forum to allow collaborative interagency and stakeholder planning and information gathering, as an extension of public scoping efforts. These Task Groups included:

- Task Group 1, Conservation Strategy
- Task Group 2, Motorized Vehicle Access Network
- Task Group 3, Regulatory Issues
- Task Group 4, Plan Implementation

A 14-member Steering Committee was established by the Supergroup to resolve deadlocks and provide guidance to the task groups.

Task groups met 47 times between December 1999 and May 2002. On two occasions task groups deadlocked on issues. Six meetings of the Steering Committee successfully resolved these deadlocks.

Numerous issues were too complex or controversial to resolve at a single task group meeting. In such cases, subcommittees composed of volunteers were asked to discuss the issue and return with a proposed solution at the following task group meeting. Task Group 1 formed over a dozen subcommittees that dealt with issues as diverse as the expensive tortoise fencing program, desert recreation, mitigation fees and compensation structure, and best management practices to apply as standard take-avoidance measures. To assist Task Group 2 and the route designation process, two subcommittees were formed: a field survey advisory group and a route designation technical committee. A subcommittee might meet once or, once established, be recalled on numerous occasions to address difficult issues. Over 50 subcommittee meetings were held in addition to task group meetings.

As the task group process evolved, certain issues would emerge that would result in considerable public interest or controversy, including the design of the motorized vehicle access network and the role of equestrians in desert planning. When this occurred, public information meetings were held throughout the desert on an irregular basis. About a dozen of these meetings, attended by up to 250 persons, were held during the task group process. Many persons who first became involved through these meetings later joined one or another of the task groups.

1.4.7 Public Review of DEIR/S

A Draft EIR/S was released for a 90-day public review that began on June 13, 2003 and ended on September 12, 2003. Public hearings were held in Victorville (July 15, 2003), Lone Pine (July 16, 2003), Ridgecrest (July 17, 2003), Redlands (July 22, 2003), Yucca Valley (July 23, 2003), Palmdale (July 24, 2003) and Barstow (July 30, 2003). Responses to written and oral comments received from the public are presented in Chapter 6 of this Final EIR/S. Chapters 1 through 5, as well as the appendices, include changes made in response to those comments.

1.5 NECESSARY DECISIONS AND APPROVALS

1.5.1 Agency and Jurisdiction Decisions and Approvals

Bureau of Land Management Implementation of the West Mojave Plan on public lands would require approval of the Plan by the BLM s California State Director through a Record of Decision (ROD). This approval process would include the amendment of the CDCA Plan to ensure consistency with the provisions of the West Mojave Plan. By executing the ROD, BLM will adopt both the West Mojave Plan and any necessary CDCA Plan amendments. The amendments that would be necessary to implement each alternative are listed in Chapter 2, beginning with Section 2.2.10, the amendments associated with Alternative A.

The West Mojave Plan Record of Decision would also amend 25 existing Area of Critical Environmental Concern (ACEC) management plans, and would serve as the ACEC management plan for 14 newly-designated ACECs. These new and revised ACEC management plans may be found in Appendix D.

The BLM Record of Decision will be issued after the final environmental impact report and statement is published, and after any protests are submitted and resolved.

Cities and Counties: Adoption of the West Mojave Plan by cities and counties would not require amendments to local jurisdiction general plan land use elements. Modifications of city and county conservation elements may occur, however, to provide reference to the West Mojave Plan and associated conservation strategies. Certain jurisdictions may also amend their zoning and development ordinances to provide consistency with the HCP s conservation strategies. Local jurisdictions adopting the West Mojave Plan would need to adopt a fee ordinance in order to implement the mitigation fee described in Chapter 2.

Measures applicable to each jurisdiction are identified in Appendix B.

United States Fish and Wildlife Service: For the West Mojave Plan s streamlined FESA compliance procedures to be implemented, USFWS would have to issue an incidental take permit under Section 10(a) of FESA to the participating cities and counties, and to Caltrans. This could include the issuance of no surprises assurances for unlisted species. A biological

opinion prepared pursuant to Section 7 of FESA would have to be issued to the BLM and any other participating federal agencies.

California Department of Fish and Game: CDFG would issue an incidental take permit under Section 2081 of CESA to the participating cities, counties and Caltrans.

1.5.2 Relationship to Statutes, Regulations and Policies

All decisions and approvals would be consistent with applicable federal and California statutes, regulations and policies, including but not limited to the following:

- Federal Endangered Species Act
- California Endangered Species Act
- National Environmental Policy Act
- California Environmental Quality Act
- California Fish and Game Code
- California Planning Statutes
- Federal Land Policy and Management Act
- National Historic Preservation Act
- California Desert Protection Act
- Clean Water Act
- Clean Air Act
- Wilderness Act
- Taylor Grazing Act
- Sikes Act
- Mining and Minerals Policy, and National Materials and Minerals Research and Development Acts
- Mining, Mineral Leasing, Material Disposal and Reclamation Acts
- Federal Executive Orders and Congressional Mandates

This plan recognizes that unforeseen national security measures may require immediate compliance by utilities to operate or construct features designed to secure and protect energy and communication systems. Should the Department of Homeland Security, Federal Energy Commission, California Energy Commission or California Public Utility Commission proclaim the necessity of such measures, utilities will be allowed to implement said measures. Appropriate mitigation and plan compliance shall be sought after the fact. W here variance to the Plan is required, parties shall negotiate to accomplish the spirit of the Plan.

1.5.3 Relationship to Other Regional Plans

Southern California and southern Nevada are the sites of a number of important regional planning efforts, many of which are addressing the same issues that are being considered by the West Mojave Plan (see Map 1-2). These include regional habitat conservation plans, natural community conservation plans and federal land use plans and amendments. In fact, most of the

land surface between Las Vegas, Nevada and San Diego, California lies within the scope of an ecosystem-planning program.

The following is a brief summary of major planning efforts being undertaken immediately adjacent to or within the West Mojave planning area.

Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP): The lead for this plan is the Coachella Valley Association of Governments. The planning area includes most of the urban and urbanizing area of the Coachella Valley as well as the Santa Rosa Mountains, and portions of Joshua Tree National Park, all within Riverside County. This MSHCP lies adjacent to and southeast of the West Mojave planning area. The plan addresses issues of urbanization on private and state lands. As part of this planning effort, BLM has prepared a separate CDCA plan amendment applicable to federal lands within the Coachella Valley plan area. Both CVMSHCP and the West Mojave Plan are developing conservation strategies for species whose range overlaps both planning areas. These include the management of the Little San Bernardino Mountains gilia, the triple-ribbed milkvetch, the Whitewater and Big Morongo Canyon ACECs and, to a minor degree, the desert tortoise. A Record of Decision for the BLM Coachella Valley CDCA Plan Amendments was signed in December 2002.

Northern and Eastern Mojave Plan (NEMO): The BLM s NEMO plan addressed recovery of the desert tortoise and management of a few additional species of concern on public lands. NEMO addressed only BLM programs, and only the BLM s CDCA Plan was amended; private lands and other federal agencies were not affected. The NEMO planning area lies to the northeast of the western Mojave Desert, in the area that generally lies between Death Valley National Park and the Mojave National Preserve. The most important cross-boundary issues that affect both NEMO and West Mojave involve the management of a small Mojave ground squirrel population northeast of Trona, and ensuring that CDCA Plan Amendments are consistent. A Record of Decision for NEMO was signed in December 2002.

Northern and Eastern Colorado Plan (NECO): The NECO plan, like NEMO, primarily concerned the management of BLM lands located to the east and southeast of the West Mojave planning area, although a broader-based planning program was conducted in collaboration with the Marine Corps, the National Park Service and local governments. NECO s decisions affected federal lands only. The most important cross-boundary issues that affect both NEMO and West Mojave involve the management of the Mojave fringe toed lizard (two thirds of the known range lies within the West Mojave, and one third within NECO), as well as ensuring that CDCA Plan Amendments are consistent. A Record of Decision for NECO was signed in December 2002.

Southern California Province Forest Plan: This plan is being prepared by four National Forests located in Southern California, including the Angelus and San Bernardino National Forests, which are adjacent to and south of the West Mojave planning area. Decisions reached by the Southern California Province Plan will affect National Forest lands only. The most important cross-boundary issues that affect both the Forest Service planning efforts and the West Mojave Plan involve the implementation of the Carbonate Habitat Management Strategy;

developing conservation programs for the San Diego horned lizard, the short-joint beavertail cactus, the gray vireo and the arroyo toad; and the coordination of motorized vehicle access networks.

Military Integrated Resource Management Plans (INRMPs): Each of the five military bases located within the West Mojave planning area has prepared, or is preparing, an INRMP to guide the management of natural resources on each base. The INRMPs affect military lands only. The most important cross-boundary issues that affect both the West Mojave Plan and INRMPs follow: (1) For Edwards Air Force Base, management of the desert tortoise, Mohave ground squirrel, alkali mariposa lily, desert cymopterus and Barstow woolly sunflower; (2) for China Lake Naval Air Weapons Station, the management of the desert tortoise, Mohave ground squirrel, Townsend s big-eared bat, bighorn sheep, and Inyo California towhee; (3) for Fort Irwin, management of desert tortoise and the Lane Mountain milkvetch; (4) for the Marine Corps Air Ground Combat Center at Twentynine Palms, the management of the desert tortoise, California leaf-nosed bat, bighorn sheep, Mojave fringe-toed lizard and white-margined beardtongue; and (5) for the Marine Corps Logistics Base near Barstow, the management of the desert tortoise.

CHAPTER TWO
ALTERNATIVES

2.1 INTRODUCTION

2.1.1 Overview

Chapter 2 describes seven alternative strategies that have been designed to conserve over 100 sensitive plants and animals and their habitats that are found within the western Mojave Desert while streamlining procedures for complying with the California and federal endangered species acts. This chapter identifies biological goals and objectives, describes the seven alternatives in depth, presents a table that compares the impacts of each of the seven alternatives, and discusses alternatives considered but eliminated from detailed consideration.

The seven alternatives include the following:

- **Alternative A: PROPOSED ACTION - HABITAT CONSERVATION PLAN.** This alternative presents a multi-species conservation strategy applicable to public and private lands throughout the planning area. It would serve as (1) an amendment of BLM s CDCA Plan for public lands, and (2) a habitat conservation plan for private lands. Incidental take permits would be issued to participating local jurisdictions and state agencies.
- **Alternative B: BLM Only.** This alternative consists of those elements of Alternative A that are applicable to, and that could be implemented on, BLM-administered public lands. It is applicable to public lands only.
- **Alternative C: Tortoise Recovery Plan.** This combines those elements of Alternative A that are applicable to the Mohave ground squirrel and other sensitive species with the management program recommended by the 1994 Desert Tortoise (Mojave Population) Recovery Plan. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies. The public expressly requested detailed consideration of this alternative during NEPA scoping meetings.
- **Alternative D: Enhanced Ecosystem Protection.** This alternative places a high priority on the conservation of ecosystems and natural communities as a means to conserve sensitive plants and animals, even if adoption of those recommendations would limit motorized vehicle access to and multiple use of the western Mojave Desert. Its recommendations had their origin in discussions among the participating agencies and members of the public during NEPA scoping and the development of Alternative A. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies.

- **Alternative E: One DWMA Enhanced Recreation Opportunities.** This alternative places a high priority on multiple uses of desert lands, including motorized vehicle recreation, even if this might preclude the implementation of some of the programs that otherwise might be implemented to conserve species and ecosystems. It also responds to a specific request raised by the public during scoping meetings that the EIR/S explore whether a single DWMA, protecting only the remaining areas of relatively higher tortoise populations, might be an effective means of conserving desert tortoises. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies.
- **Alternative F: No DWMA Aggressive Disease and Raven Management.** This alternative proposes a tortoise conservation strategy that relies on an aggressive program of tortoise disease management and raven control, supported by limited fencing, rather than the establishment of tortoise DWMAs to protect habitat. Subject to these modifications, the Alternative A conservation program for other species would be implemented. CDCA Plan amendments and a habitat conservation plan would be adopted and incidental take permits would be issued to participating local jurisdictions and state agencies.
- **Alternative G: No Action.** Existing conservation strategies currently being applied by each of the participating agencies would continue to be implemented.

Alternative A is discussed first and in depth. This discussion includes a tabular summary of CDCA Plan amendments. The description of each of the other alternatives incorporates the Alternative A discussion by reference; only those components of any given alternative that differ from Alternative A are presented.

An alphanumeric designation has been assigned to each management prescription. Thus the first desert tortoise prescription is labeled DT-1, the third Mohave ground squirrel prescription is referred to as MGS-3, and so forth. Prescription designations include the following: AM (adaptive management), B (bird), Bat (bats), DT (desert tortoise), E (education), HCA (habitat conservation area), LG (livestock grazing), M (monitoring), Mam (mammals), MGS (Mohave ground squirrel), MR (Mojave River), MV (motorized vehicles), P (plant), R (reptiles), Rap (raptors), AB (Alternative B), AC (Alternative C), AD (Alternative D), AE (Alternative E) and AF (Alternative F). Where management prescriptions are duplicative among species, the first cited notation is used.

2.1.2 Biological Goals and Objectives

Measurable biological goals have been developed for each of the species addressed by the West Mojave Plan in accordance with habitat conservation plan requirements established by USFWS. For some species not included in the habitat conservation plan for permit coverage, goals are presented for BLM management. The biological goals are intended to be the broad guiding principles for the Plan s conservation program, and are applicable to all alternatives, though application of the goals to land ownership and to species may differ with each alternative. Biological goals are presented in Table 2-1.

In addition to the biological goals, biological objectives have been developed for the more complex strategies proposed for the desert tortoise, the Mohave ground squirrel, and certain other species. Biological objectives are the measurable components needed to achieve the biological goal such as preserving sufficient habitat, managing the habitat to meet certain criteria, or ensuring the persistence of a specific minimum number of individuals. Goals and objectives can be either habitat or species based, and must be consistent with conservation actions needed to minimize and mitigate impacts to the covered species. The goals promote an effective monitoring program and help determine the focus of an adaptive management strategy.

Table 2-1
Biological Goals and Objectives

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES
Alkali mariposa lily	Goal 1. Maintain the hydrological processes that support alkali mariposa lily at the Rosamond Lake Basin and outlying seeps, meadows and springs. Goal 2. Conserve and maintain the hydrological processes at outlying sites representative of alkali spring, meadow, and seep habitats. Goal 3. Identify additional springs, meadows, seeps, and playas supporting rare alkali plants.	Objective 1: Conserve a contiguous area of playa edge habitat on private lands adjacent to EAFB. Objective 2: Acquire Rabbit Springs and Paradise Springs (including water rights) through willing seller purchase or exchange. Objective 3: Conserve additional springs with occupied habitat as Conservation Area or ACEC. Objective 4: Maintain integrity of Amargosa Creek to the extent feasible
Barstow woolly sunflower	Goal 1: Protect a contiguous habitat block with conserved populations on public lands throughout the species range Goal 2: Establish an additional reserve through adaptive management in the western part of the range. Goal 3: Manage the remaining outlying populations by site-specific measures.	Objective 1: Consolidate BLM and CDFG lands northeast of Kramer Junction to form a core reserve. The core reserve will be an expanded BLM ACEC and CDFG ecological reserve. Objective 2: Acquire private lands containing known occurrences within the core reserve. Objective 3: Establish a survey requirement area north of EAFB and northwest of Kramer Junction to identify reserve boundaries Objective 4: Require avoidance on a project basis.
Bats California leaf-nosed bat, Townsend s big-eared bat	Goal 1: Maintain and enhance viability of all bat populations in the planning area, regardless of species.	Objective 1: Install bat-accessible gates at the entrance of all significant roosts. Objective 2: Protect foraging habitat for California leaf-nosed bat. Objective 3: Adopt uniform survey requirements and mitigation measures. Objective 4: Establish baseline population numbers.
Bendire s thrasher (BLM only)	Goal 1: Protect and enhance known populations and habitat on public land.	Objective 1: Establish four Bendire s thrasher conservation areas. Objective 2: Establish baseline numbers for all portions of the Conservation Areas.
Brown-crested flycatcher	Goal 1: Conserve and enhance all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Eradicate invasive riparian plants in suitable nesting habitat.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES
Burrowing owl	Goal 1. Prevent direct incidental take. Goal 2. Protect and enhance known populations and habitat on public land	Objective 1: Provide educational program for jurisdictions. Objective 2: Evaluate the feasibility of establishing grassland preserves.
Cushenbury buckwheat, Cushenbury milkvetch, Cushenbury oxytheca, Parish's daisy, Shockley's rockcress	Goal 1: Conserve two major unfragmented populations on BLM lands contiguous with populations on Forest Service lands. Goal 2: Protect outlying populations of Parish s daisy from grazing.	Objective 1: Establish an ACEC where management is focused on protection of the carbonate endemic plants. Objective 2: Acquire fee title or conservation easements on private land within the ACEC. Objective 3: Adaptively manage populations on reclaimed mine sites.
Charlotte's phacelia	Goal 1: Maintain and enhance existing occurrences and habitat.	
Crucifixion thorn	Goal 1: Preserve disjunct populations on public land and protect the crucifixion thorn woodland community.	
Desert cymopterus	Goal 1: Establish a conservation area containing known occurrences. Goal 2: Protect all known populations from disturbance, including grazing.	Objective 1: Identify potential and suitable habitat. Objective 2: Conduct surveys within potential and suitable habitat to establish baseline population numbers and acreage of occupied habitat.
Desert tortoise	Goal 1: Protect sufficient habitat to ensure long-term tortoise population viability.	Objective 1.1: Establish a minimum of three, preferably four, Desert Wildlife Management Areas that would be managed for the long-term survival and recovery of the desert tortoise, and which would also benefit other special-status plant and animal species. Objective 1.2: Ensure that at least one DWMA exceeds 1,000 square miles in size. Objective 1.3: Design DWMAs so that they are well distributed across the recovery unit, edge-to-area ratios are minimized, impediments to the movement of tortoises are avoided, and (where feasible) boundaries are contiguous.
	Goal 2: Establish an upward or stationary trend in the tortoise population of the West Mojave Recovery Unit for at least 25 years.	Objective 2.1: Achieve population growth rates (lamdas) within DWMAs of at least 1.0. Objective 2.2: Attain a minimum average population density of 10 adult female tortoises per square mile within each DWMA. Objective 2.3: Establish a program for tortoise population monitoring that would detect an increase, decrease, or stable trend in tortoise population densities, and include an information feedback loop that ensures that necessary changes would be made in management.
	Goal 3: Ensure genetic connectivity among desert tortoise populations, both within the West Mojave Recovery Unit, and between this and other recovery units.	Objective 3.1: Delineate and maintain movement corridors between DWMAs, and with the Eastern Mojave Recovery Unit, the Eastern Colorado Recovery Unit, and the Northern Colorado Recovery Unit. Objective 3.2: Ensure a minimum width of two miles for movement corridors, and include provisions for major highway crossings.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES
	Goal 4: Reduce tortoise mortality resulting from interspecific (e.g. raven predation) and intraspecific (e.g. disease) conflicts that likely result from human-induced changes in the ecosystem processes.	Objective 4.1: Initiate proactive management programs addressing each conflict, to be implemented by each affected agency or jurisdiction. Objective 4.2: Establish an environmental education program to facilitate public understanding and support for proactive management programs necessary to reduce tortoise mortality. Objective 4.3: Continue research programs and monitoring programs that assess the relative importance of human activities and natural processes that affect desert tortoise populations.
Ferruginous hawk	Goal 1: Minimize electrocutions	Objective 1: Require raptor-safe electrical distribution lines for all new construction Objective 2: Identify problem poles on electrical distribution lines and retrofit as necessary.
Golden eagle (BLM only)	Goal 1: Preserve at least 90% of the baseline number of nesting territories. Goal 2: Minimize electrocutions.	Objective 1: Establish a new baseline number of nesting territories within five years of Plan adoption. Objective 2: Require raptor-safe electrical distribution lines for all new construction. Objective 3: Identify problem poles on electrical distribution lines and retrofit as necessary.
Gray vireo	Goal 1: Conserve at least one core block of suitable nesting habitat.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Identify other occupied habitat.
Inyo California towhee	Goal 1: Conserve and enhance all riparian habitat on public lands within the range of the Inyo California towhee.	Objective 1: Remove non-native vegetation at springs with occupied habitat. Objective 2:Fence springs as necessary to protect the riparian habitat from damage by feral burros or excessive human use.
Kelso Creek monkeyflower (BLM only)	Goal 1: Protect all occurrences and potential habitat on public lands as a Conservation Area.	Objective 1: Protect occupied habitat from disturbance.
Kern buckwheat	Goal 1: Protect all known occurrences.	Objective 1: Protect occupied habitat from disturbance.
Lane Mountain milkvetch	Goal 1: Protect viable unfragmented habitat throughout the limited range.	Objective 1: Acquire occupied habitat on private lands. Objective 2: Minimize potential impacts on public lands.
Least Bell's vireo	Goal 1: Conserve and enhance all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Maintain Proper Functioning Condition of riparian areas Objective 4: Eradicate invasive riparian plants in suitable nesting habitat.
LeConte's Thrasher	Goal 1: Protect and enhance known populations and habitat.	Objective 1: Conserve habitat for thrasher within tortoise DWMAs. Objective 2: Establish a series of reserves representing all historical parts of the range.
Little San Bernardino Mountains gilia	Goal 1: Protect all occurrences on public lands and 90% of the known populations on private land. Goal 2: Protect the drainages and fluvial processes that maintain the gilia populations.	Objective 1: Protect occupied habitat within 100 feet of the edges of dry washes on both sides as a Conservation Area. Objective 2: Limit channelization of washes with occupied habitat.
Long-eared owl	Goal 1: Preserve all nest sites and communal roosts.	Objective 1: Maintain Proper Functioning Condition of riparian areas Objective 2: Minimize human disturbance at nest sites and communal roosts.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES
Mojave fringe-toed lizard	Goal 1: Establish Conservation Areas at eight of the fourteen occupied habitats.	Objective 1: Maintain blowsand ecological processes at the eight identified sites. Objective 2: Protect occupied habitat.
Mohave ground squirrel	Goal 1. Ensure long-term protection of MGS habitat throughout the species range.	Objective 1.1: Upon Plan adoption, establish management areas for the long-term conservation of MGS habitat: (a) the MGS Conservation Area for the protection of unfragmented habitats outside military installations; (b) heightened project review in northeastern Los Angeles County to minimize development of MGS habitats in the southern portion of the range. Objective 1.2: Allow for adjustments to the MGS Conservation Area boundary based on findings of scientific studies. Objective 1.3: Implement appropriate actions to ensure the long-term protection of habitat in the MGS Conservation Area throughout the life of the Plan. Objective 1.4: On a yearly basis, track the loss of MGS habitat resulting from Plan implementation. Objective 1.5: Cooperate with military installations by sharing scientific information and reviewing management plans (INRMP, CLUMP) to assist environmental managers in evaluating MGS habitat protection on the bases.
	Goal 2. Ensure long-term viability of the MGS throughout its range.	Objective 2.1: Minimize and fully mitigate the impacts of the Plan s authorized incidental take of the MGS. Objective 2.2: Upon Plan adoption, initiate and conduct studies that would determine the following measurable biological parameters: (1) the regional status, (2) potential hot spots (refugia), (3) genetic variation throughout the range, and (4) the ecological requirements of the MGS. Objective 2.3: Establish long-term study plots throughout the range and annually monitor their MGS populations. Fund continued monitoring in the Coso Range to provide baseline population data. Objective 2.4: Use the biological and population data from Goal 2, Objectives 2 and 3 to modify the management prescriptions, as warranted, to ensure the long-term viability of the species.
Mojave monkeyflower	Goal 1: Protect viable populations on public land throughout the range. Goal 2: Coordinate with mining companies to protect this species.	Objective 1: Establish a core reserve on public land in the Brisbane Valley. Objective 2: Establish a core reserve west of the Newberry Mountains. Objective 3: Provide site-specific management of occupied habitat on public lands outside the core reserves. Objective 4: Establish a private land mitigation bank
Mojave River vole	Goal 1: Conserve all remaining riparian and wetland occupied habitat. Goal 2: Conduct research and monitoring programs.	Objective 1: Establish permanent study plots and conduct baseline studies. Objective 2: Monitor changes in vole populations and habitat. Objective 3: Identify, map and survey all appropriate habitat along the Mojave River corridor. Objective 4: Maintain groundwater levels in Mojave River that support the riparian habitat. Objective 5: Maintain Proper Functioning Condition of riparian areas Objective 6: Manage disturbance to riparian habitat, including visitor use. Objective 7: Remove non-native vegetation on public land and on private land where permission is granted.
Mojave tarplant	Goal 1: Protect viable populations on public lands. These populations may be disjunct.	Objective 1: Require 50% conservation of newly detected populations on private land.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES
Ninemile Canyon phacelia	Goal 1: Protect viable populations on public land throughout the range.	Objective 1: Prevent or reduce damage from grazing. Objective 2: Require 50% conservation of newly detected populations on private land.
Parish's alkali grass	Goal 1: Conserve the single private land location. Goal 2: Determine if additional populations are present at other alkaline springs and seeps.	Objective 1: Acquire Rabbit Springs if willing seller.
Parish's phacelia	Goal 1: Preserve large intact populations on the publicly owned dry lakebeds. Goal 2: Conserve a public land corridor connecting the dry lakes.	Objective 1: Establish Conservation Area including occupied habitat and essential connectivity. Objective 2: Acquire private land within Conservation Area from willing seller. Objective 3: (HCA-3) prohibit vehicle traffic on playas within Conservation Area. Objective 4: (P-48) San Bernardino county will perform site-specific review for projects within occupied habitat. Objective 5: (P-50) BLM will require restoration of occupied habitat.
Parish's popcorn flower	Goal 1: Conserve the single private land location. Goal 2: Determine if additional populations are present at other alkaline springs and seeps.	Objective 1: Acquire Rabbit Springs if willing seller.
Prairie falcon	Goal 1: Preserve all nest sites. Goal 2: Maintain population numbers	Objective 1: Reduce disturbance at nest sites.
Red Rock poppy	Goal 1: Conserve and maintain all occurrences in the El Paso Mountains.	Objective 1: Reduce or eliminate threats, including disturbance from OHV use. Objective 2: Require 50% conservation of newly detected populations on private land.
Red Rock tarplant	Goal 1: Conserve and maintain all occurrences in the El Paso Mountains.	Objective 1: Reduce or eliminate threats, including disturbance from OHV use. Objective 2: Require 50% conservation of newly detected populations on private land.
Salt Springs checkerbloom	Goal 1: Conserve the single private land location. Goal 2: Determine if additional populations are present at other alkaline springs and seeps.	Objective 1: Acquire Rabbit Springs if willing seller. Objective 2: Require 90% conservation of the Salt Spring checkerbloom occupied habitat at newly found sites, along with maintenance of the hydrological regime.
San Diego horned lizard	Goal 1: Conserve unfragmented habitat within the range.	Objective 1: Conserve two large representative areas, Big Rock Creek and Mescal Creek, with connectivity of the overall range through the National Forests. Objective 2: Acquire lands within Antelope Valley Significant Ecological Area.
Short-joint beavertail cactus	Goal 1: Conserve unfragmented habitat within the range.	Objective 1: Conserve two large representative populations that are contiguous with National Forest lands. Objective 2: Acquire lands within Antelope Valley Significant Ecological Area.
Southwestern pond turtle	Goal 1: Conserve all remaining populations throughout the range.	Objective 1: Identify new populations in suitable habitat. Objective 2: Conserve all remaining populations in the Mojave River, Lake Elizabeth and Amargosa Creek. Maintain groundwater levels in Mojave River that support the riparian habitat. Objective 3: Maintain Proper Functioning Condition of riparian areas in occupied habitat. Objective 4: Continue restoration at Camp Cady and Afton Canyon.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES
Southwestern willow flycatcher	Goal 1: Conserve and enhance all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Maintain Proper Functioning Condition of riparian areas in Kelso Valley and east Sierra Canyons. . Objective 4: Achieve regional public land health standards for grazing in Kelso Valley and in east Sierra canyons. Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.
Summer tanager	Goal 1: Conserve and enhance all suitable riparian nesting habitat outside developed areas.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas. Objective 5: Eradicate invasive riparian plants in nesting habitat.
Triple-ribbed milkvetch	Goal 1. Prevent any loss of occupied habitat Goal 2. Conduct research and monitoring.	Objective 1. Require avoidance of known or newly-detected populations. Objective 2. Compile new information to determine best conservation strategy.
Vermilion flycatcher	Goal 1: Conserve and enhance all suitable riparian nesting habitat outside developed areas.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas. Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.
Western snowy plover	Goal 1: Preserve all nest sites and maintain and enhance nesting and wintering habitat on public lands.	Objective 1: Prevent disturbance of nest sites during nesting season.
Western yellow-billed cuckoo	Goal 1: Conserve and enhance all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Maintain Proper Functioning Condition of riparian areas in Kelso Valley and east Sierra Canyons. . Objective 4: Eradicate invasive riparian plants in suitable nesting habitat.
White-margined beardtongue	Goal 1: Preserve the wash and sand field habitat of the disjunct population on public land.	Objective 1: Establish Conservation Area near Pisgah Crater.
Yellow-breasted chat	Goal 1: Conserve and enhance all suitable riparian nesting habitat.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas. Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES
Yellow-eared pocket mouse	Goal 1: Maintain and enhance existing habitat.	Objective 1: Manage grazing on public lands to maintain habitat values.
Yellow warbler	Goal 1: Conserve and enhance all suitable riparian nesting habitat.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas. Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.

2.2 ALTERNATIVE A: PROPOSED ACTION: HABITAT CONSERVATION PLAN

Alternative A presents a multi-species conservation strategy applicable to public and private lands throughout the planning area. It was developed by the participating agencies with the intent that it would serve as (1) an amendment of BLM s CDCA Plan for public lands, and (2) a habitat conservation plan for private lands. Incidental take perm its would be issued to participating local jurisdictions and state agencies. Map 2-1 (foldout map at end of this document) displays components of this alternative.

The strategy is intended to achieve two overarching goals: first, to provide an economic stimulus to communities within the western Mojave Desert by simplifying the process of complying with CESA and FESA, and second, to fulfill federal and California mandates to conserve natural communities and sensitive species.

The narrative description of this alternative is organized as follows:

- Habitat Conservation Area
- Compensation Framework
- Incidental Take Permits
- Species Conservation Measures
- Public Land Livestock Grazing Program
- Public Land Motorized Vehicle Access Network
- Education Program
- Monitoring and Adaptive Management

To implement this alternative on public lands administered by the Bureau of Land Management, 12 amendments of the California Desert Conservation Area Plan would be necessary. Table 2-2 presents a summary of those amendments. It also cross-references more detailed discussions of each alternative that appear later in this chapter.

Table 2-2
Summary of BLM CDCA Plan Amendments

AMENDMENT		SUMMARY	SEE SECTION
N0.	TITLE		
1	New ACECs	Designate 14 new ACECs including: • Four Desert Tortoise DWMAs • Bendire s Thrasher • Carbonate Endemic Plants Research Natural Area • Coolgardie Mesa • Kelso Creek Monkeyflower • Middle Knob • Mojave Fringe-toed Lizard • Mojave Monkeyflower • West Paradise • Parish s Phacelia • Pisgah	2.2.1
2	ACEC Boundary Amendments	Modify boundaries of four ACECs: • Afton Canyon (See Amendment 6 below and Map 2-4) • Barstow Woolly Sunflower • Harper Dry Lake (Map 2-5) • Rand Mountains (See Amendment 5 below)	2.2.1
3	Multiple Use Class Changes	Change Multiple Use Class in Following Areas: • Afton Canyon Natural Area • Bendire s thrasher Conservation Area • Carbonate Endemics Plants ACEC • Lands adjacent to Edwards AFB • Inyo County Disposal Parcels • Land Tenure Adjustment Project • Little San Bernardino Mountains Gilia Habitat • Los Angeles County Significant Ecological Areas • Mojave Fishhook Cactus ACEC • Mojave Fringe-toed Lizard Conservation Area • Mojave Monkeyflower ACEC • Mohave Ground Squirrel Habitat • Non-Wilderness Class C Lands • North Edwards Conservation Area • Pisgah ACEC • San Gabriel Mountains Foothills • Tortoise DWMAs	2.2.1.2.1 Table 2-4
4	Mohave Ground Squirrel WHMA	Designate the Mohave Ground Squirrel Conservation Area as a Wildlife Habitat Management Area	2.2.1.1.3 Map 2-1

AMENDMENT		SUMMARY	SEE SECTION
N0.	TITLE		
5	Rand Mountains Fremont Valley Management Plan	Amend the CDCA Plan to implement the 1994 Rand Mountains Fremont Valley Management Plan • Expand Western Rand Mountains ACEC • Multiple Use Class Changes • Adopt Motorized Vehicle Access Network • Designate Desert Tortoise Category I Habitat • Authorize Mineral Withdrawal • Implement a use permit program.	2.2.1.2.4
6	Afton Canyon Natural Area	Modify ACEC boundaries, adopt motorized vehicle access network, change multiple use class designations.	2.2.1.2.5 Map 2-4
7	West Mojave Land Tenure Adjustment Program	Modify boundaries of consolidation, retention and disposal zones to conform to conservation area goals.	2.2.1.2 Map 2-6
8	Regional Public Land Health Standards and Guidelines for Grazing Management	Standards and Guidelines, already adopted for BLM CDCA Public Lands outside of the West Mojave, would be adopted for lands within the planning area	2.2.5
9	Route Designation	Adopt minor modifications of the network of motorized vehicle access routes that were adopted as a component of the CDCA Plan by BLM on June 30, 2003. Modifications include redesign of Juniper subregion, route closures in Lane Mountain milk vetch, Barstow woolly sunflower and Mojave monkeyflower conservation areas and Red Mountain subregion, network adjustments in Wonder Valley and east of Haiwee Reservoir, and establishment of competitive C routes northeast of Spangler Hills Open Area.	2.2.6.7 2.2.6.8
10	Motorized Vehicle Stopping, Parking and/or Vehicular Camping	Amend Motorized Vehicle Access Element s Stopping and Parking Section, incorporating following restrictions within DWMAs: • Motorized vehicle based camping limited to previously existing disturbed camping areas adjacent to routes designated open • Motorized vehicle stopping and parking allowed within 50 feet of centerline of routes designated open	2.2.6.4
11	Barstow to Vegas Race Course	Delete that portion of the Barstow to Vegas Race Course that lies within the West Mojave Planning Area.	2.2.6.5
12	Stoddard Valley to Johnson Valley	Delete competitive event corridor. Establish connector route. No competitive speed events allowed.	2.2.6.5

2.2.1 Habitat Conservation Area

A network of ecosystem conservation areas would be established to protect viable populations of native plant and animal species and their habitats. Collectively, these are referred to as the *Habitat Conservation Area* or HCA. A description of the HCA, its component parts, and limits on new ground disturbance within the HCA follows.

2.2.1.1 Structure and Components

2.2.1.1.1 Overview

Conservation Areas: The HCA would be composed of eighteen conservation areas that are intended to conserve the habitat of particular species, groups of species or biologically important geographic areas. Conservation areas include those established to protect:

- *Desert tortoise.* Four tortoise conservation areas would be established. They are referred to as tortoise DWMAs (Desert Wildlife Management Areas) because this name is consistent with the terminology used by the Desert Tortoise (Mojave Population) Recovery Plan, and has been adopted by other regional planning efforts throughout the listed range of the tortoise.

- *Particular species (except the desert tortoise).* These bear the name of the species being protected, such as Mohave Ground Squirrel Conservation Area or the Alkali Mariposa Lily Conservation Area.

- *Groups of species or an important habitat.* These areas are given a geographic name, such as the Middle Knob Conservation Area.

Conservation areas may overlap one another. For example, the tortoise DWMAs and the Mohave Ground Squirrel Conservation Area partially overlap, and the Barstow Woolly Sunflower Conservation Area is located within this overlap zone. Within such areas, all of the prescriptions associated with each overlapping conservation area apply.

Open Space Corridors: Three open space corridors would protect critical linkages and wildlife movement corridors. These corridors connect the HCA with surrounding State Parks, National Park Service and Forest Service lands.

Special Review Areas (SRA): Lands not adjacent to the HCA but possessing biological values for which a heightened environmental review of new projects would be conducted.

Biological Transition Areas (BTA): The Draft EIR/S proposed that strips of land adjacent to desert tortoise DWMAs would be designated as biological transition areas, wherein a heightened biological review of all new projects would be conducted to ensure that such projects would not degrade the biological integrity of or conflict with the conservation goals established for the adjacent tortoise DWMA. Since that time the participating counties, San Bernardino and Kern in particular, have expressed strong concerns that the BTA concept would be highly complex, would be very difficult to implement and offered little in the way of additional conservation for desert tortoises. In response to these and other concerns expressed during the public comment period, the West Mojave Team re-evaluated each BTA on an individual basis to determine the values that each area was anticipated to provide. Those areas with important

conservation values were included within the tortoise DWMAs and those areas that were judged to have minimal contribution to the overall conservation design were deleted. Map 2-1 reflects those changes, which are described in detail in Appendix X.

2.2.1.1.2 Desert Tortoise Component of HCA

Tortoise DWMAs: (HCA-1) Four tortoise DWMAs including about 2,381 square miles would be established. The boundaries of these DWMAs correspond to the general boundaries identified by the Desert Tortoise (Mojave Population) Recovery Plan (Recovery Plan): the Fremont-Kramer (803 square miles) and Superior-Cronese (1003 square miles) DWMAs, which are adjacent; the Ord-Rodman DWMA (392 square miles); and the Pinto DWMA (183 square miles). Tortoise DWMAs would be managed for tortoise conservation and recovery until which time the tortoise may be delisted as per criteria given in the Recovery Plan.

Public lands administered by the BLM within Tortoise DWMAs would be designated as ACECs. The West Mojave Plan would serve as the ACEC management plan so that future ACEC plans for the four Tortoise DWMAs would not be required.

Existing ACECs that lie within the boundary of the Tortoise DWMAs (included ACECs) would be maintained, unless specifically deleted by the West Mojave Plan. The provisions of the Tortoise DWMAs would augment, rather than replace, current ACEC protections. If a provision of an included ACEC s management plan conflicts with any of the measures described herein for the Tortoise DWMA, the measures identified by this alternative take precedence and the included ACEC s management plan would be amended to conform to the West Mojave Plan.

Within DWMAs, most current BLM multiple use class designations would be retained. Designations would be changed in the following areas: ;

- Within the Western Rand Mountains ACEC, the multiple use class would change from class M to class L (see section 2.2.1.2, below).
- Elsewhere in the DWMA, all Class M lands would be changed to Class L.
- Those lands removed from the LTA disposal zone would change from Unclassified to Class L.

All BLM-administered public lands within Tortoise DWMAs would be managed as BLM Category I tortoise habitat. All public lands outside of the Tortoise DWMAs that are within the range of the tortoise would be managed as BLM Category III Tortoise Habitat.

A total of 1,523,936 acres would be included within the DWMAs. This total includes 1,351,466 acres of BLM, private and State of California lands that are currently designated as critical habitat. Based upon field surveys conducted between 1998 and 2001, 72,179 acres of critical habitat that were found to possess only marginal worth as tortoise habitat would not be included within the DWMAs, while 172,470 acres not designated as critical habitat but found to

include important tortoise populations would be included in the DWMAs. Thus the 1,523,936 acres of BLM, private and State of California lands within DWMAs is 100,291 acres greater than the 1,423,645 acres of those lands currently designated as critical habitat.

2.2.1.1.3 Mohave Ground Squirrel Component of HCA

MGS Conservation Area: (HCA-2) A conservation area would be established for the long-term survival and protection of the MGS. This MGS Conservation Area would include portions of the Fremont-Kramer and Superior-Cronese Tortoise DWMAs, and additional, essential habitats located west and north of the two tortoise DWMAs. A total of 1,726,712 acres would be included within the conservation area. The MGS in all other areas would either be managed by the military or be available for incidental take subject to restrictions identified by this alternative.

Within the MGS Conservation Area, the public land south of Owens Lake classified by the CDCA Plan as multiple use class M would be changed to class L.

Public lands within the MGS Conservation Area would be designated as a BLM Wildlife Habitat Management Area in the BLM s CDCA Plan.

Sierra Foothills Habitat Connector: There exists a narrow band of MGS habitat along the eastern side of the Sierra Nevada that is considered to be a very important corridor linking MGS habitats from north to south. Highway 178 west of Freeman Junction bounds this corridor to the south, Olancha bounds the north, the Sierra Nevada the west (up to about 5,500 feet), and Highway 14 and 395 the east. Although this area is already part of the MGS Conservation Area, special review of projects should occur in this area to ensure that the narrow corridor is not completely severed.

Los Angeles County Significant Ecological Area: Los Angeles County has identified a Significant Ecological Area (SEA) for northeastern Los Angeles County that should prove beneficial to protection of the MGS. Within SEAs, the County performs a heightened environmental review for new projects. The West Mojave Plan would adopt these provisions as a means of protecting the MGS in the southern portions of its range.

2.2.1.1.4 Other Conservation Areas

(HCA-3) Fourteen conservation areas (in addition to the tortoise DWMAs and the MGS Conservation Area) would be established to conserve species and habitats of biological significance. All conservation areas, and general management measures to be applied in each, are presented in Table 2-3. Species-specific conservation measures applicable within the conservation areas are described in subsequent sections. Map 2-1 (foldout map at end of document) indicates the regional location of the conservation areas. Specific maps of the following conservation areas are presented later in this chapter, as a part of the more detailed discussion of species conservation strategies in section 2.2.4: the two Lane Mountain Milkvetch

conservation areas (Map 2-10, the Coolgardie and West Paradise Conservation Areas); the Carbonate Endemic Plants Conservation Area (Map 2-11), the Alkali Mariposa Lily Conservation Area (Map 2-12), the North Edwards Conservation Area (Map 2-12A) and the Pisgah Conservation Area (Map 2-12B)

Table 2-3
Other Conservation Areas

CONSERVATION AREA	ACRES	CONSERVATION MEASURES
Fremont-Kramer DWMA	511,901	See discussion under desert tortoise.
Superior-Cronese DWMA	629,389	See discussion under desert tortoise.
Ord-Rodman DWMA	247,080	See discussion under desert tortoise.
Pinto Mountains DWMA	117,016	See discussion under desert tortoise.
MGS Conservation Area	1,726,722	See discussion under Mohave ground squirrel.
Alkali Mariposa Lily	7,243	Establish a conservation area located south and west of Edwards Air Force Base.
Barstow Woolly Sunflower	36,211	Establish a conservation area composed of BLM, CDFG and private lands northeast of Kramer Junction, entirely within the Fremont-Kramer DWMA. Most of the conservation area would become an addition to the CDFG West Mojave Ecological Reserve, pending completion of a land exchange between the BLM and CDFG. The remaining public lands would be designated a BLM ACEC. Management would include acquisition of private lands, signing and designation of vehicle routes. The CDFG would prepare a management plan for the Ecological Reserve after the land exchange is completed.
Bendire's Thrasher	28,046	Establish a conservation area with three sub-units, in southern Kelso Valley in Kern County, and northern Lucerne Valley and Coolgardie Mesa in San Bernardino County. Designate public lands within the conservation area as an ACEC.
Big Rock Creek	10,785	Conservation management should be compatible with existing land uses in the SEA and should not infringe on either permitted mining operations or mining operations conducted pursuant to vested rights, and should enhance potential for improvements of a regional hiking and equestrian trail. Protection of the riparian habitat, wildlife corridor and ecological processes for the Mojave fringe-toed lizard would be priorities.
Carbonate Endemic Plants	5,169	Designate public lands east of Highway 18 in the foothills of the San Bernardino Mountains as an ACEC to protect four federally listed and one unlisted species of plants, as well as the San Diego horned lizard, gray vireo, and bighorn sheep. Lands within the proposed ACEC would be subject to a standard of no surface occupancy to prevent undue and unnecessary degradation of lands under the surface mining regulations. Private lands within the proposed ACEC may be purchased or exchanged for BLM lands in Lucerne Valley. Acquired lands would be withdrawn from mineral entry. The CDCA Plan multiple use class would change from class M to class L.

CONSERVATION AREA	ACRES	CONSERVATION MEASURES
Coolgardie Mesa	13,354	This area north of the Mud Hills lies entirely within the Superior-Cronese DWMA and includes a small portion of the Rainbow Basin Natural Area. The Conservation Area would be designated as an ACEC. Reserve-level management would apply to the conservation area, including withdrawal from mineral entry (subject to valid existing rights), minimization of vehicle routes of travel, and fencing if deemed necessary to protect Lane Mountain milkvetch. Private lands that may be acquired would be withdrawn from mineral entry.
Kelso Creek Monkeyflower	1,870	Establish a conservation area for this West Mojave endemic on public lands with known occupied and potential habitat. Maintain regional standards for rangeland health, monitor grazing, fence private/BLM property lines, and designate vehicle routes of travel.
Middle Knob	20,495	Designate public lands as an ACEC. Require avoidance of all covered species of plants and animals, designate vehicle routes of travel to ensure compatibility with the purposes of the ACEC and with the Pacific Crest Trail, and prohibit new wind energy development on public lands. Restore and protect occupied habitat for Kern buckwheat.
Mojave Monkeyflower		Establish an ACEC composed of two units, in the southern Brisbane Valley and near Daggett Ridge.
	10,663	Brisbane Valley: BLM would retain 10,633 acres between the Mojave River and Interstate 15 in public ownership. Designate routes of travel, amend the LTA program to remove these public lands from the disposal zone, change the multiple use class from Unclassified and I to L and implement mitigation and monitoring procedures. Discontinue sheep grazing. Establish a survey incentive area surrounding the conservation area wherein applicants for new ground disturbing activities would have the option of mitigating at 2:1 or conducting a biological survey, the results of which could result in a lower mitigation fee. Establish a 9,358-acre mining area where procedures w ould be implemented to encourage the establishment of a mitigation or conservation bank by the mining industry. Additional mitigation for existing plans of operation and SMARA reclamation plans would not be required in the mining area.
	36,424	Daggett Ridge: Designate routes of travel with the goal of eliminating routes within washes, unnecessary parallel routes, and routes bisecting populations of Mojave monkeyflower. New utilities locating within the existing CDCA Plan utility corridor would be required to avoid monkeyflower occurrences to the maximum extent practicable and provide mitigation fees for compensation lands where avoidance is infeasible. Change multiple use class from M to L.
Mojave Fringe-toed Lizard		Designate a four-unit conservation area:
	8,485	1. Mojave River east of Barstow (to be designated as an ACEC and multiple use class L))
	1,267	2. adjacent to Saddleback Butte State Park in Los Angeles County
	18,889	3. in and adjacent to the Sheephole Wilderness east of Twentynine Palms, to be designated an ACEC.
	14,224	4. Pisgah ACEC.
		Manage lands at Alvord Mountain and Manix and Cronese Basin ACECs.

CONSERVATION AREA	ACRES	CONSERVATION MEASURES
		Prohibit windbreaks and designate routes. In Los Angeles County, acquire land, impose limitations on flood control, and establish guidelines for highway improvements.
North Edwards	12,702	Establish conservation area to protect desert cymopterus and Barstow woolly sunflower. Acquire conservation easements on the privately owned land. Conduct botanical surveys and adjust boundaries based on survey results.
West Paradise	1,243	This area lies entirely within the Superior-Cronese DWMA and adjoins the military lands of the Fort Irwin National Training Center near Lane Mountain. Designate the West Paradise Conservation Area as an ACEC. Reserve-level management will apply to the conservation area, including withdrawal from mineral entry (subject to valid existing rights), minimization of vehicle routes of travel, and fencing if deemed necessary to protect these endangered plants. Private lands that may be acquired will be withdrawn from mineral entry.
Parish s Phacelia	898	Prohibit vehicle travel on the series of dry lakes with occupied habitat. Acquire private lands with occupied habitat.
Pisgah	19,828	Designate an ACEC that includes the eastern half of the existing Pisgah Crater Research Natural Area and lands to the northeast that include sensitive plant habitat. Designate routes of travel, including the Johnson Valley to Parker race corridor on a specified route partially within the ACEC. Change the CDCA Plan multiple use class from M to L. Allow existing mineral extraction operations to continue.

2.2.1.1.5 Open Space Corridors

(HCA-4) Three open space corridors are proposed to protect critical linkages and wildlife movement corridors (see foldout Map 2-1). These corridors include Big Rock Creek corridor, the Joshua Tree to Yucca Valley corridor and the Liebre Ridge to Antelope Valley Poppy Preserve State Park corridor.

Big Rock Creek: Conservation of Big Rock Creek wash in its natural state would preserve a known wildlife movement corridor for larger animals moving between the mountains and the desert. It also provides habitat connectivity for Saddleback Buttes State Park, which would otherwise be an isolated block of public (state) lands. Los Angeles County recognizes the Big Rock Creek open space corridor in both its existing and proposed system of Significant Ecological Areas. Conservation of Big Rock Creek was does not preclude development of mining operations within or adjacent to the wash, provided that such operations are conducted in a manner that will accommodate the movement of larger animals. Additionally, mining operations will be conducted in a manner that does not interfere with the natural processes (i.e. sediment transport) in the Big Rock Creek wash necessary for preservation of the Mojave fringe-toed lizard.

Joshua Tree to Yucca Valley: This linkage would connect Joshua Tree National Park (JTNP) and the San Bernardino Mountains and would enhance dispersal of bighorn sheep. It would also provide conserved lands for the endemic Little San Bernardino Mountains gilia, triple-ribbed milkvetch and the disjunct population of the Bendire s thrasher. The BLM has already taken steps to establish a linkage between the National Park and the mountains with the expansion of the Big Morongo ACEC, though several parcels of private land are included in the potential corridor. This area was identified as an open space corridor by the Town of Yucca Valley General Plan in 1994, and thus is consistent with Town policies. In addition, the Wildlands Conservancy has already acquired a substantial amount of land in this area.

Portal Ridge to Antelope Valley Poppy Preserve: Los Angeles County has included a linkage from the San Gabriel Mountains to the Antelope Valley Poppy Preserve State Park as part of its proposed San Andreas Rift Zone Significant Ecological Area. Alternative A would adopt the proposed SEA boundaries. This corridor would also protect remnant native grassland and wildflower fields plant communities and habitat for the burrowing owl. A habitat linkage would prevent the Poppy Preserve from being an isolated block of protected lands.

2.2.1.1.6 Special Review Areas (SRA)

There exist regions that are not well suited for inclusion within the Tortoise DWMAs, although they contain relatively high numbers of tortoises. The land ownership pattern may be too fragmented, and the size too small. While these areas are not suited for long-term conservation, enough tortoises are present to warrant a heightened level of environmental review for new projects.

The special management required for protection of the Little San Bernardino Mountains gilia also warrants designation of a Special Review Area.

(HCA-6) Three Special Review Areas would be established: the Brisbane Valley SRA (located between Interstate 15 and National Trails Highway), Copper Mountain Mesa SRA (located north of Highway 62, between Yucca Valley and Twentynine Palms), and the Joshua Tree SRA, located south of Highway 62 near the community of Joshua Tree. The first two areas contain relatively high numbers of tortoises, but are isolated, small and composed of fragmented land ownership patterns. Neither is particularly well suited for designation as a Tortoise DWMA. The Joshua Tree SRA would be established for conservation of the Little San Bernardino Mountains gilia. Conservation of the gilia would be an additional requirement within the Copper Mountain Mesa SRA.

Management within the tortoise SRAs would focus on take avoidance rather than on long term tortoise conservation. Clearance surveys would be performed throughout the SRA by tortoise biologist(s) authorized to move tortoises out of harm s way. Protective fencing may be needed to preclude tortoises from a development site in the absence of a biological monitor. BLM public lands would be managed as Category III tortoise habitat.

Management of the gilia SRA would require avoidance of known occurrences and a setback from the banks of desert washes within this area. Flood control would be by non-structural floodplain management and acquisition of easements rather than constructed improvements to stream channels.

2.2.1.2 Miscellaneous BLM Management Issues

Establishing the Habitat Conservation Area on public lands would require BLM to amend the multiple use class of numerous parcels of land, address issues associated with the wilderness designations of the California Desert Protection Act of 1994, establish new ACECs, and resolve several pending land use issues. These are described below. The discussion is organized as follows:

- BLM Multiple Use Class Changes
- California Desert Protection Act Non-Wilderness
- BLM Areas of Critical Environmental Concern
- Rand Mountains Fremont Valley Management Plan
- Afton Canyon Natural Area
- Harper Dry Lake
- Western Mojave Land Tenure Adjustment Project
- Mojave River Wild and Scenic River Eligibility Determination

2.2.1.2.1 BLM Multiple Use Class Changes

Alternative A proposes several changes in the multiple use class (MUC) assigned by BLM s CDCA Plan to public lands within the planning area. These changes are indicated on Map 2-2 (see attached CD Rom). Multiple use class changes are listed in Table 2-4. Within DWMAs, current BLM class designations would be retained, except as specifically noted below.

Table 2-4
BLM Multiple Use Class Changes

LOCATION	MUC CHANGE	ACRES	COMMENTS
Western Rand Fremont Valley Management Area (HCA-7)	M to L	34,835	Recommended in 1994 ACEC management plan.
Afton Canyon Natural Area (HCA-8)	M to L	1,225	Better reflects goals of 1989 ACEC management plan. T 11N, R 5E E ‰ of Section 14, portions of Sections 13, 23, and 24.
Bendire s thrasher conservation area (B-1)	M to L	717	North Lucerne Valley Kelso Valley
Carbonate Endemic Plants ACEC (HCA-9)	M to L	3,932	Class L better protects critical habitat.
Little San Bernardino Mountains Gilia habitat (P-35)	Unclassified to M	1,922	Lands adjoining Joshua Tree National Park.
Mojave Fishhook Cactus ACEC (HCA-12)	Unclassified to L	638	T 8N, R 4W E ‰ of Section 32 T 7N, R 4W N ‰ of Section 4
Mojave Fringe-toed Lizard Conservation Area (HCA-3)	Unclassified to L M to L	3,341 3,718	Mojave River parcels
Mojave Monkeyflower Conservation Area (HCA-3)	U to L M to L	10,448 25,351	Brisbane Valley Daggett Ridge
Inyo County (HCA-13)	M to Unclassified L to U I to U	3,532 2,534 26	Ten parcels. These lands would immediately become available for disposal or transfer to Inyo County or directly to private ownership in exchange for acquisition of habitat within HCA or other conservation areas identified in this plan. (Map 2-7)
Non-Wilderness Class C lands (HCA-14)	C to L C to M C to I	3,969 842 105	Intent is to reflect the California Desert Protection Act (CDPA), enacted in 1994 by the United States Congress. See section 2.2.1.2.2, below.
Land Tenure Adjustment within DWMA	U to L	21,902	Lands within DWMA removed from disposal under LTA and MUC changed to reflect adjacent retention or consolidation zone.
Land Tenure Adjustment within DWMA	M to L	48,666	Lands within DWMA changed from Retention Zone to Consolidation Zone under LTA and MUC changed.
Land Tenure Adjustment to prevent urban encroachment on EAFB	U to M	1,225	T 9N, R 12W - SW ..of Section 10. T 10N, R 12W SW ..of Section 34. T 10N, R 11W All BLM parcels in Sections 10 and 12.
Mohave Ground Squirrel Habitat (HCA-16)	Unclassified to L	181	Lands between Saddleback Butte State Park and Edwards AFB in Los Angeles County: T 8N, R 9W - Portions of Sections 27 and 30. T 7N, R 9W - Portions of Sections 3, 11, and 15.
Mohave Ground Squirrel Habitat (HCA-2)	M to L U to L	136,086 144	Lands in Inyo County south of Owens Lake.
Mohave Ground Squirrel Habitat	I to L	5,391	Linkage southeast of Searles Lake (SB Co.)
Desert Tortoise DWMAs	M to L U to L	365,485 34,566	Change all lands within tortoise DWMAs currently Class M, I or U to Class L.

LOCATION	MUC CHANGE	ACRES	COMMENTS
	I to L	1,983	
Searles Lake	I to Unclassified	40	T 25S, R43E, Section 21. Parcel to be sold or exchanged to facilitate landfill transfer.
Pisgah ACEC	M to L	13,524	Proposed ACEC Lands
Summit Valley Arroyo toad habitat (including critical habitat)	Unclassified to M	1,814	T 3N, R5W, portions of Sections 12, 16, 17, 20, 21, 22, 23, 24, 27, 28. T 3N, R 4W, portions of Sections 17, 18.
San Gabriel Mountains Foothills (B-9)	Unclassified to M	706	T 4N, R 8W - portions of Section 17 T 4N, R 9W portions of Sections 2, 3, 11, 14, and 15.
Los Angeles County SEAs (HCA-17, B-9)	Unclassified to M	164 316 93 38 234 395 75 326 265	SEA #47: T 8N, R 9W NW ..Section 30. SEA #48: T 5N, R 9W - S ‰ of Section 6. SEA #51: T 7N, R8W - Portions of SW ..Section 19. SEA #52: T 7N, R 9W - Portions of Sections 31. SEA #54: T 7N, R 9W - Portions of Section 32. SEA #55: T 4N, R 8W - portions of Sections 3, 4, 10, 13, and 24. T 6N, R 8W - Portions of S ‰ of Section 33. SEA #56: T 6N, R 13W - Portions of Section 13. SEA #58: T 7N, R 15W -Portions of Sections 13, and 14. SEA #61: T 5N, R 12W- Portions of Sections 26 and 35.
North Edwards Conservation Area (HCA-18)	Unclassified to M	1,134	Lands NW of Kramer Junction. T 11N, R 7W - Section 26, Portions of Section 28.

2.2.1.2.2 California Desert Protection Act Non-Wilderness

The BLM s 1980 CDCA Plan identified wilderness study areas and recommended certain of them for designation by Congress as wilderness (multiple use class C (controlled) lands). In 1994, Congress determined which of the public lands should be designated as wilderness, taking into consideration BLM s recommendations and other factors. This designation occurred through enactment of the 1994 California Desert Protection Act. Congress did not, however, designate all class C lands as wilderness. In such cases, the CDCA Plan provides as follows:

> Areas not approved by Congress would, unless Congress directed specific management in lieu of wilderness, return without [multiple use class] designation. They would immediately become part of a Plan amendment proposal and a public planning process would ensue as part of that year s input into the land use decision as well as consideration by the District Multiple Use Advisory Committee. In the interim between Congressional rejection and the District Manager s decisions, areas would be managed under the Class L guidelines. [CDCA 1982 Plan Am endment Numbr 53]

Congress failed to designated 4,839 acres of class C lands as wilderness. Accordingly, CDCA Plan multiple use class changes would be made to reflect the decisions of Congress in 1994 (see Table 2-3, HCA-14). These new designations would be based on sensitivity of resources, kinds of uses, and other criteria identified in this alternative. In total, this would involve a change of 3,997 acres from class C to Class L, and 842 acres from Class C to Class M.

None of the prohibited uses in wilderness are specified as components of either Alternative A or any of the alternatives. Should any such prohibited uses in wilderness (e.g., construction of structures or use of motorized equipment) become necessary to implement the plan, then a site specific environmental assessment would be prepared. An alternative that does not require any of the prohibited uses would be included in that analysis.

Specific changes proposed include the following:

- Bighorn Wilderness - near Rattlesnake Canyon. 290 acres from Class C to Class L.
- San Gorgonio Wilderness - Upper Big Morongo Canyon and upper Little Morongo Canyon - N of Highway 62. 126 acres from C to L.
- Sheephole Valley Wilderness - A small strip south of Highway 62 and north of Joshua Tree National Park. 51 acres from C to M.
- Rodman Mountains Wilderness - Small strips of land on boundaries plus the Red Top Cinder Mine "cherrystem". 242 acres from C to L, and 240 acres from C to M.
- Newberry Mountains Wilderness - 219 acres from C to L. 50 acres from C to M.
- Golden Valley Wilderness - 52 acres from C to L. 501 acres from C to M. 105 acres from C to I.
- El Paso Mountains Wilderness - 362 acres from C to L.
- Owens Peak and Sacatar Trail Wildernesses - 2707 acres from C to L.

2.2.1.2.3 BLM Areas of Critical Environmental Concern

Implementation of Alternative A would create 14 new BLM ACECs, modify the boundaries of two others, and result in the modification of the management strategies presented in 26 existing ACEC management plans. Five ACECs would not be affected. The West Mojave Plan would serve as the ACEC management plan for each of the new ACECs. In addition, all necessary amendments of existing ACEC management plans would be set forth in the West Mojave Plan. Appendix D lists all new and amended ACECs, and presents new and amended management strategies for each ACEC.

In the event of a conflict between an ACEC management prescription and a CDCA Plan multiple use class guideline or a provision of a CDCA Plan element, the ACEC management prescription takes precedence and will apply.

2.2.1.2.4 Rand Mountains Fremont Valley Management Plan

The BLM s 1994 Rand Mountains Fremont Valley Management Plan (Rand Plan) determined that four amendments of the BLM s CDCA Plan were necessary to allow full implementation of the Rand Plan. These changes are incorporated as components of Alternative A, and are depicted on Map 2-3. They follow:

- (HCA-19) Expand the Western Rand ACEC by 13,120 acres.

- Change the CDCA Plan multiple use class designation of the 13,120 acres of class M lands in the Western Rand ACEC expansion area to class L (see Table 2-4, HCA-7).

- (HCA-20) Close the entire management area to off highway vehicle use except for 129 miles of designated open routes.

- (HCA-21) Categorize a portion of the Rand Mountains Fremont Valley management area as Desert Tortoise Category I habitat.

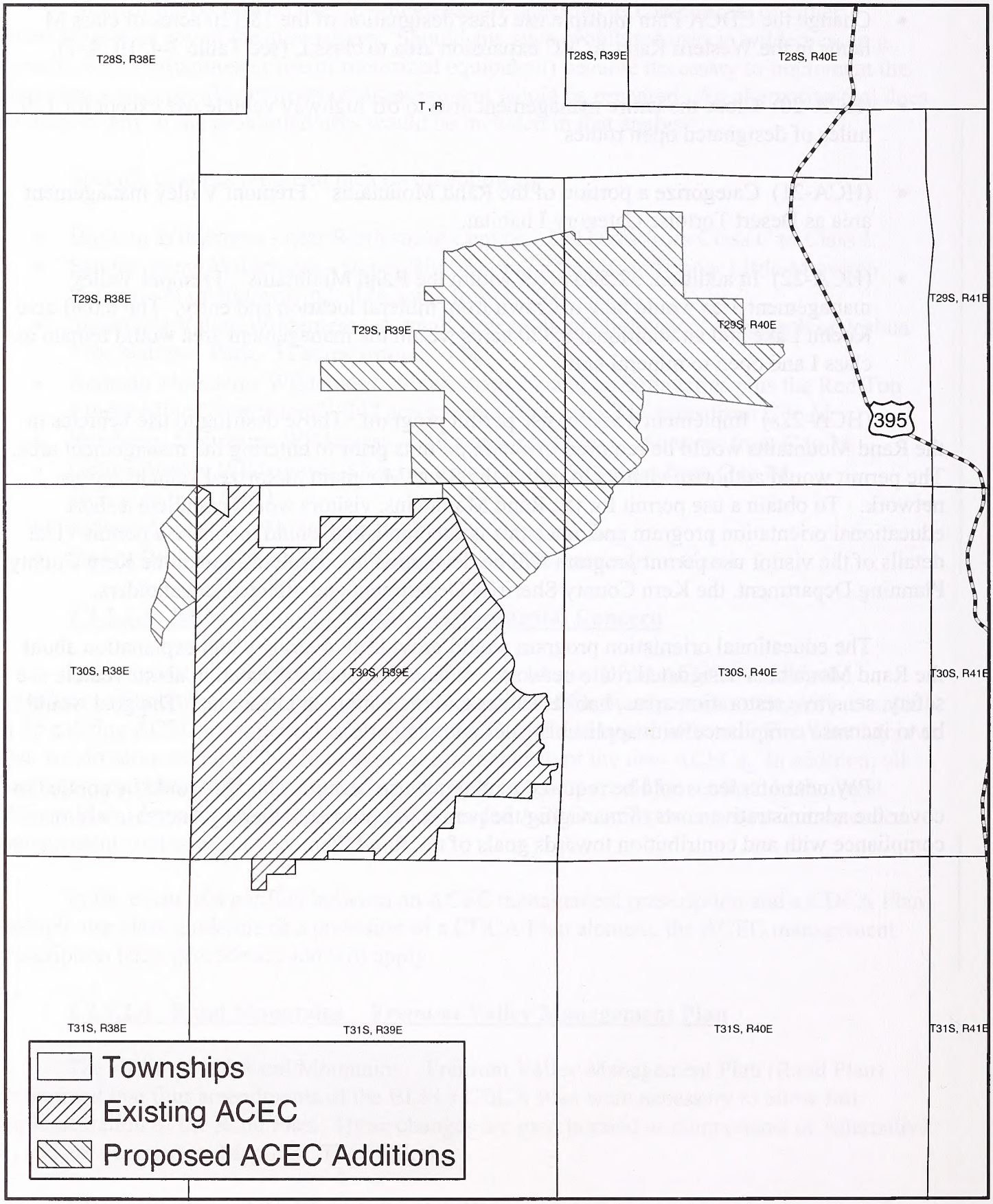
- (HCA-22) In addition, 32,590 acres within the Rand Mountains Fremont Valley management area would be withdrawn from mineral location and entry. The 6,090-acre Koehn Lake and an additional 8,320 acres within the management area would remain as class I and open to mineral entry.

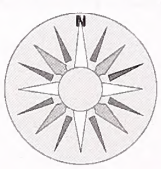
(HCA-22a) Implement a visitor use permit program. Those desiring to use vehicles in the Rand Mountains would be required to obtain permits prior to entering the management area. The permit would authorize visitors to utilize the Rand Mountain motorized vehicle access network. To obtain a use permit for the Rand Mountains, visitors would complete a short educational orientation program and, once this is accomplished, could purchase a permit. The details of the visitor use permit program will be developed in consultation with the Kern County Planning Department, the Kern County Sheriff s Department and affected stakeholders.

The educational orientation program would provide an overview and explanation about the Rand Mountains designated route network. It would include information about vehicle use safety, sensitive restoration areas, habitat values and recreation opportunities. The goal would be to increase compliance with applicable rules and regulations.

Payment of a fee would be required to obtain a use permit. This fee would be applied to cover the administrative costs of managing the permit program and, thereby, increase visitor compliance with and contribution towards goals of the Rand Plan.

Rand Mountains CDCA Plan Amendment





West Mojave Plan FEIR/S
Map 2-3

Scale: 1 : 150,000

0 1 2 3 Km

0 1 2 3 Miles

7/28/04

2.2.1.2.5 Afton Canyon Natural Area

The Afton Canyon Natural Area management plan (1989) was prepared in cooperation with the CDFG under the Sikes Act. It covers a larger area than the Afton Canyon ACEC. The plan protects the riparian community in the Mojave River, the scenic values of the canyon, and the adjacent desert habitat in the Cady Mountains, which is occupied habitat for bighorn sheep and contains nest sites for prairie falcon and golden eagle.

The 1989 management plan determined that amendments of the BLM s CDCA Plan were necessary to implement the 1989 plan. These amendments (See Map 2-4) would be made through the West Mojave planning process:

- (HCA-23) The boundary of the ACEC would be expanded by 3,840 acres and 480 acres would be deleted, making the expanded ACEC 8,160 acres in size.

- The CDCA Plan multiple use class designations would be changed from M to L on certain lands within the expanded ACEC (see Table 2-3, HCA-8).

- Adopt the network of vehicle access routes identified by the ACEC plan as a component of the CDCA Plan s motorized vehicle access network (see section 2.2.7, below).

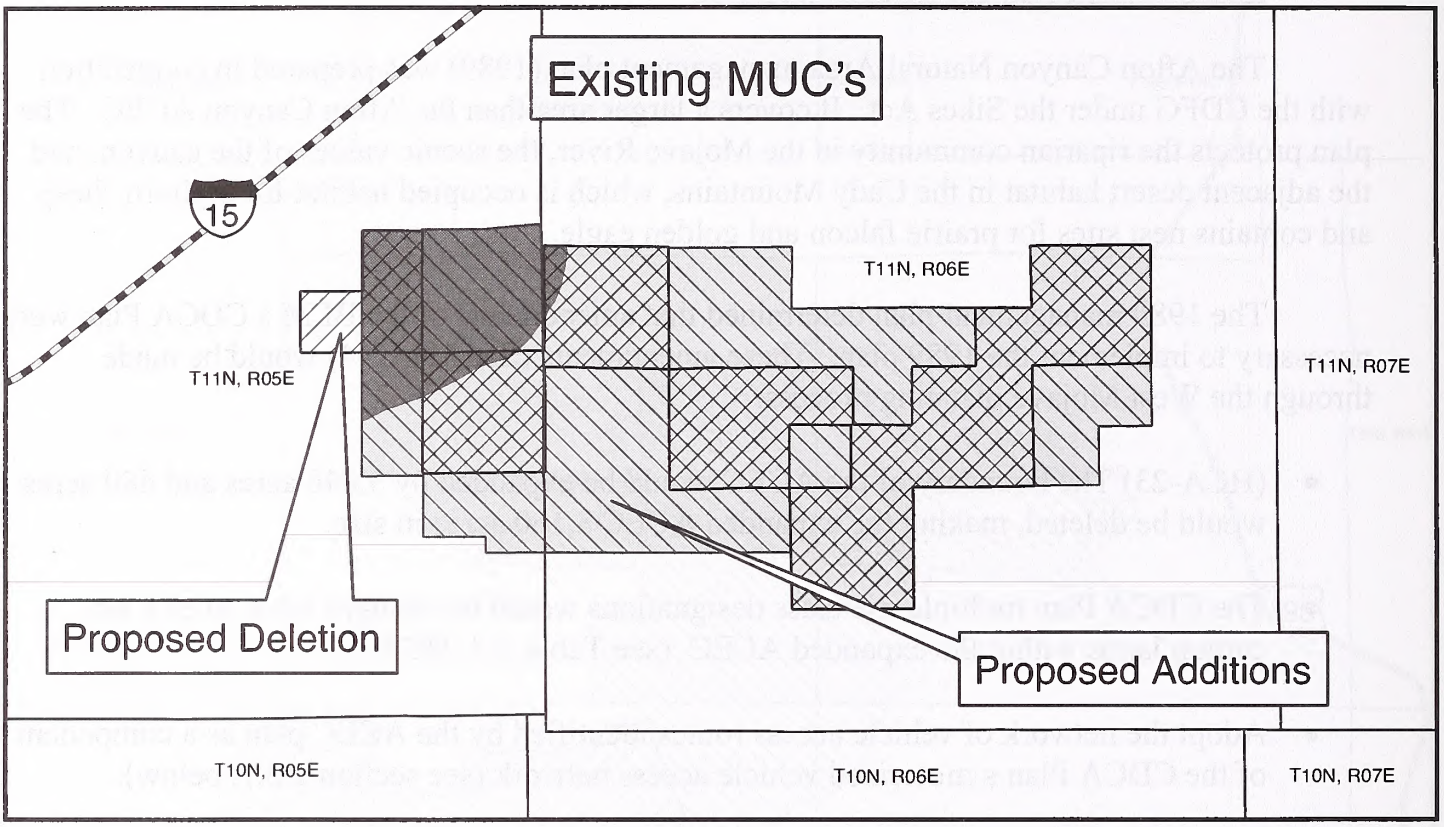
- (HCA-24) In addition, all lands within the expanded ACEC boundary would be withdrawn from mineral location and entry.

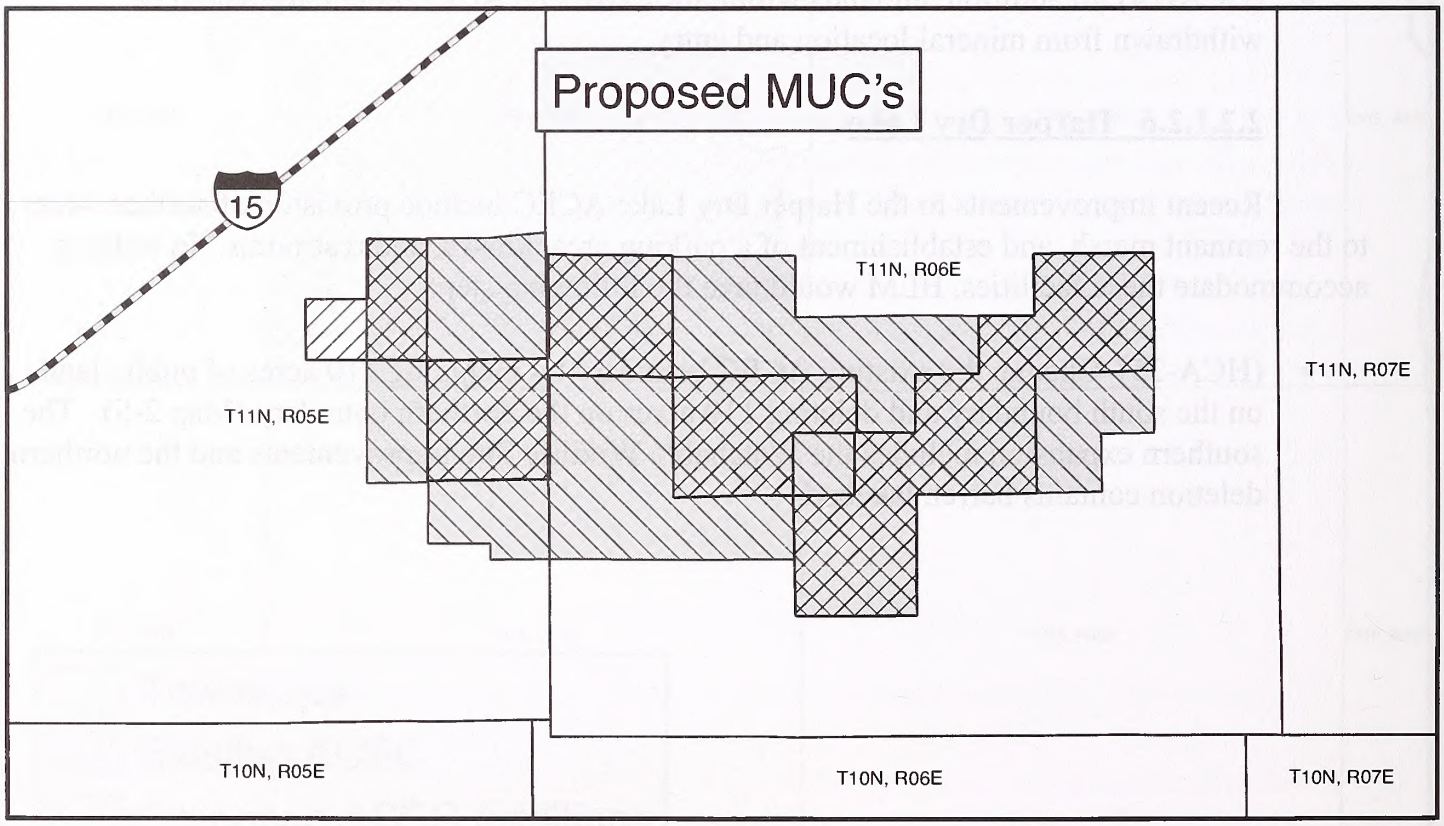
2.2.1.2.6 Harper Dry Lake

Recent improvements to the Harper Dry Lake ACEC include provision of surface water to the remnant marsh, and establishment of a parking area, kiosks, and restrooms. In order to accommodate these facilities, BLM would take the following step:

- (HCA-25) Change the existing ACEC boundary by including 110 acres of public lands on the south boundary and deleting 110 acres on the northern boundary (Map 2-5). The southern expansion includes the Watchable Wildlife Site improvements and the northern deletion contains barren lakebed.

Afton Canyon CDCA Plan Amendments





Townships
Existing ACEC
Proposed ACEC
Limited
Moderate

West Mojave Plan FEIR/S

Map 2-4

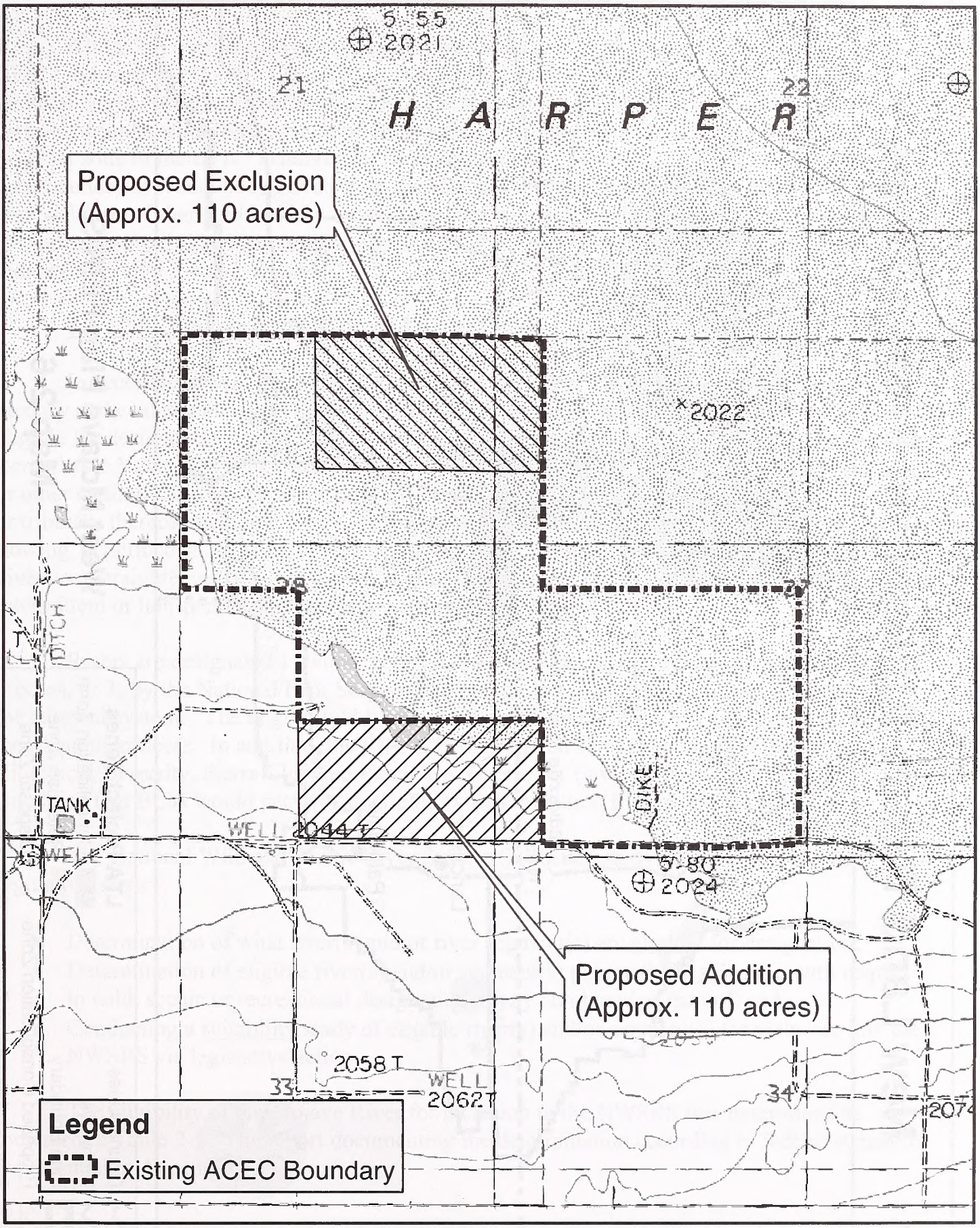
Scale: 1 : 110,000

0 1 2 Km

0 1 2 Miles

7/28/04

Harper Dry Lake CDCA Plan Amendments

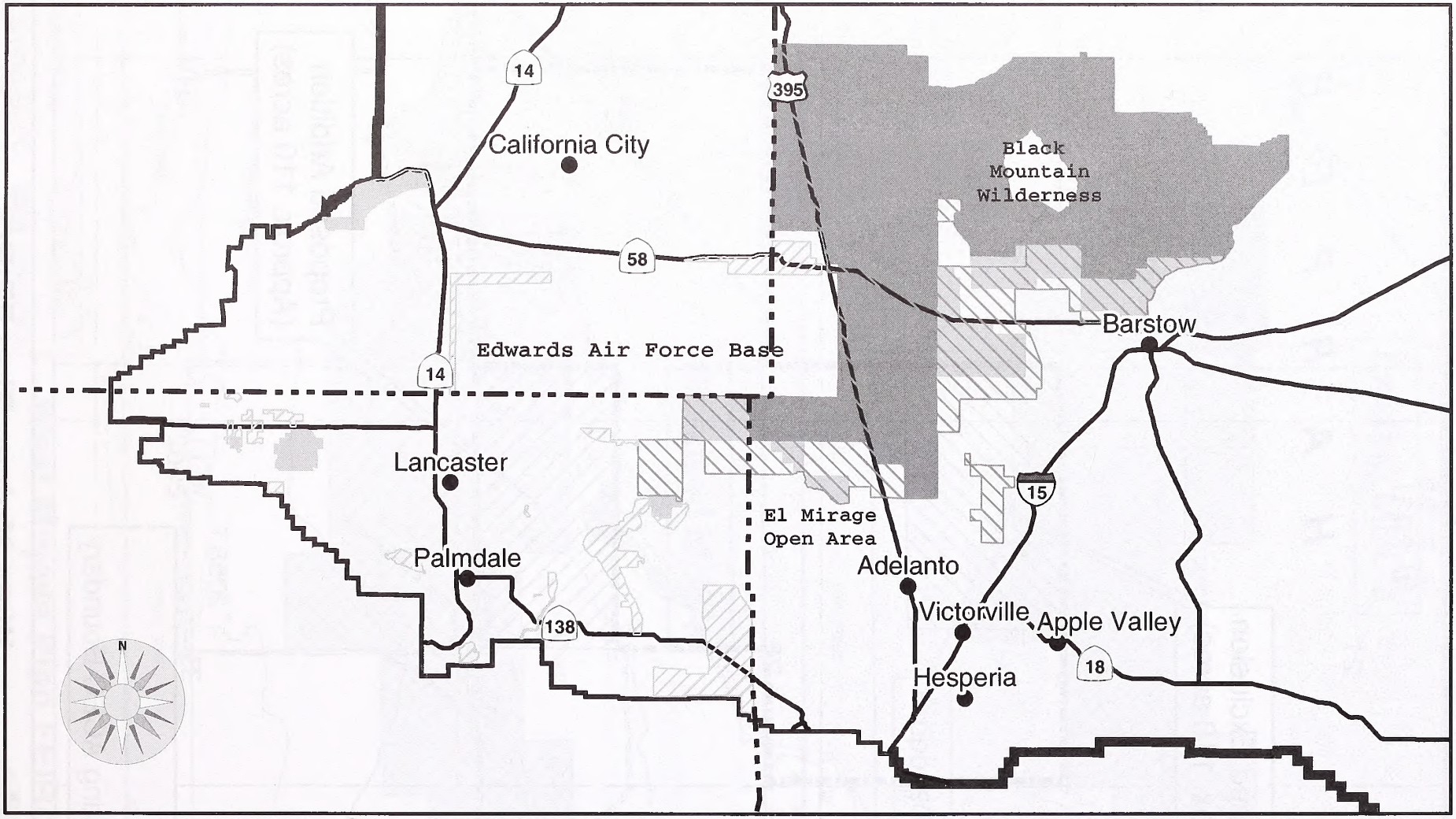


West Mojave Plan FEIR/S
Map 2-5

Scale: 1 : 18,000
0 0.25 0.5 Km
0 0.25 0.5 Miles

7/29/04

New Land Tenure Adjustment Project Zones



County Lines
Highways
Plan Boundary
Proposed Consolidation Zone
Proposed Retention Zone

LTA Project Zones
Consolidation Zone
Retention Zone
Disposal Zone
State Park Lands

West Mojave Plan FEIR/S

Map 2-6

Scale: 1 : 960,000

0 10 20 30 Km

0 10 20 30 Miles

7/29/04

2.2.1.2.7 Western Mojave Land Tenure Adjustment Project

(HCA-26) Boundaries of retention, consolidation and disposal zones established by the BLM Edwards AFB 1991 Land Tenure Adjustment Project would be modified so that no disposal zones are included within the HCA. Scattered parcels that provide habitat for San Gabriel Mountains foothills species or are within an existing SEA are also removed from the disposal zone of the LTA. Scattered BLM lands bordering Edwards AFB on the northwest and west boundaries would be removed from disposal under the LTA to prevent urban encroachment. Other lands within the existing disposal zone would remain available for disposal (including many isolated [or orphan] parcels in the Antelope and Victor Valleys). These are indicated on Map 2-6 and in Table 2-4.

2.2.1.2.8 Mojave River Wild and Scenic River Eligibility Determination

In accordance with the Wild and Scenic Rivers Act of 1968 (PL 90-542), the BLM must identify and evaluate all rivers that have potential for wild and scenic river designation. To be eligible for designation, a river must be free flowing and contain at least one Outstandingly Remarkable Value (ORV), i.e. scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar value. A river m eans a flowing body of water or estuary or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills and small lakes. Free-flowing is defined as existing or flowing in a natural condition without im poundment, diversion, straightening, rip-rapping or other modification of the waterway. Rivers with intermittent or non-perennial flows may be eligible for designation.

Rivers are designated 1) when requested by Congress, 2) through an agency planning process, or 3) by the National Park Service when requested to include a State designated river in the national system. The eligibility determinations made in the West Mojave Plan arise through the planning process. In addition, the CDCA Plan litigation settlement with the Center for Biological Diversity, Sierra Club and Public Employees for Environmental Responsibility stipulated that BLM would perform an eligibility determination for the Mojave River.

The National Wild and Scenic River System (NWSRS) study process includes three regulatory steps:

- Determination of what river(s) and/or river segment(s) are eligible for designation;
- Determination of eligible river(s) and/or segment(s) potential classification with respect to wild, scenic or recreational designation or any combination thereof; and
- Conducting a suitability study of eligible river(s) and/or segment(s) for inclusion into the NWSRS via legislative action.

The eligibility of the Mojave River for inclusion in the NWSRS was determined as indicated in Table 2-5. The report documenting the determination according to federal standards is presented in Appendix F.

Table 2-5
Mojave River Wild and Scenic River Eligibility

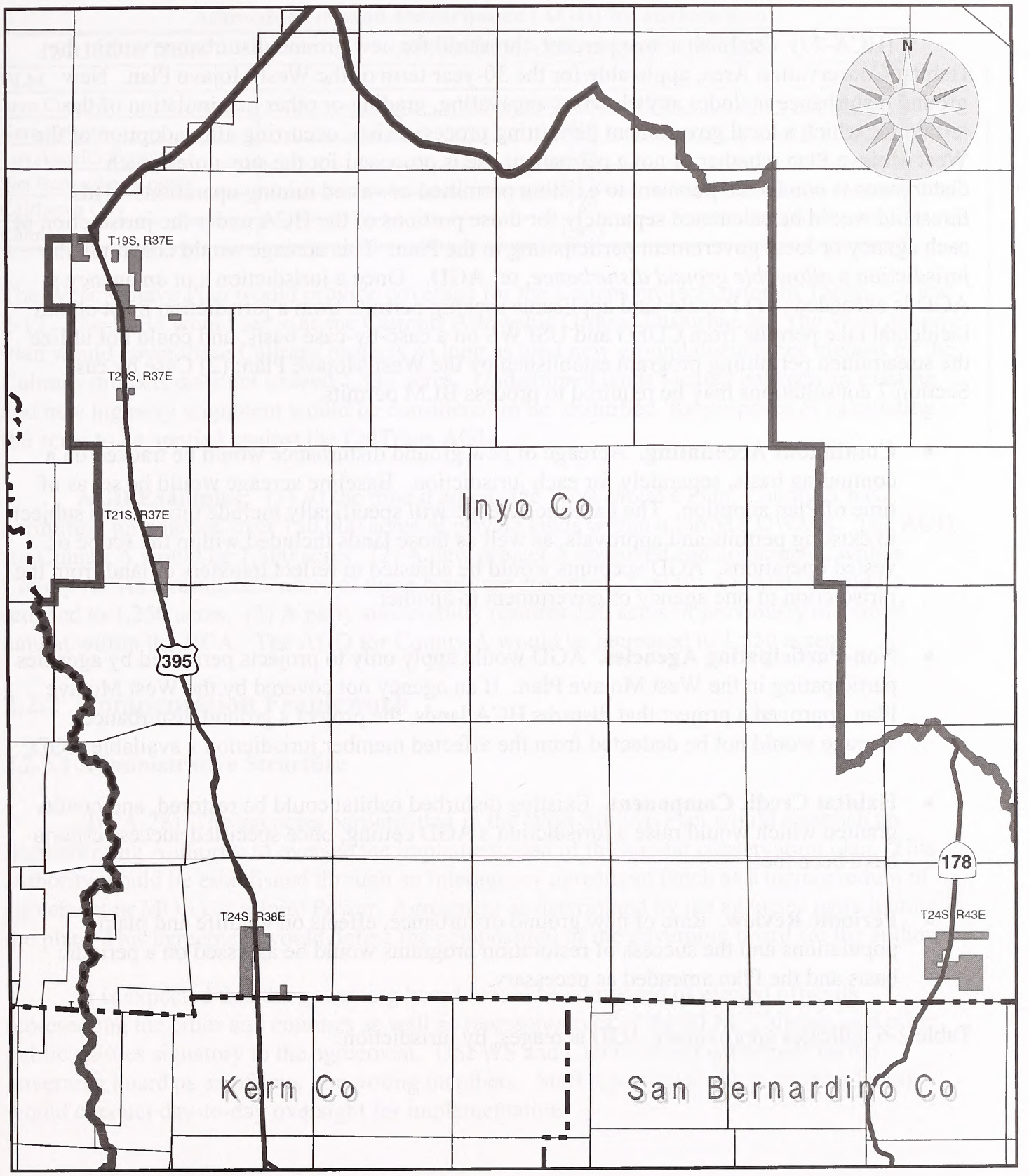
RIVER REACH	LENGTH	COMMENTS
Mojave Forks Dam to Spring Valley Lake	11 miles	Not eligible no free flowing water. Public land limited to two parcels totaling 0.375 miles.
Spring Valley Lake to Interstate 15 bridge	3.5 miles	No determination. No public land.
Interstate 15 bridge to Oro Grande	4.5 miles	No determination. No public land.
Oro Grande to Helendale	10 miles	No determination. No public land.
Helendale to Barstow	19 miles	Not eligible no free flowing water. Public land limited to 2.25 miles in three parcels.
Barstow to Harvard Road crossing	22 miles	Not eligible no free flowing water. Public land on 8.0 miles in 5 separate parcels.
Harvard Road crossing to Basin Road	22.5 miles	Eligible in part. Free flowing water for 2.9 miles. Recommended classification of Recreational for this segment. Outstanding remarkable scenic, geologic, recreational, wildlife, cultural and historic values. Public land limited to 14 miles in this reach. Seven miles are within Afton Canyon ACEC and one mile is within Manix ACEC.
Basin Road to Soda Lake (Mojave National Preserve)	8 miles	Not eligible no free flowing water. Public land covers 7 river miles within Rasor Open Area.

Selected other river segments have been evaluated for wild and scenic river status within the West Mojave Plan area. The Coachella Valley Amendment to the BLM CDCA Plan determined that public land portions of Whitewater Canyon and Mission Creek (main channel, North Fork, South Fork and West Fork) were eligible for designation as wild and scenic rivers. Portions of Big Morongo Canyon and Little Morongo Canyon within the West Mojave Plan area were determined to be not eligible.

2.2.1.2.9 Inyo County Land Disposal Tracts

Ten parcels of land, encompassing approximately 6,400 acres, and located adjacent to existing major highways and towns, have been identified for disposal in Inyo County. The intent of this measure is to encourage development to locate close to existing transportation and urban facilities, rather than in conservation areas. These are indicated on Map 2-7.

Inyo County Land Disposal Tracts



Legend

- County Lines
- Highways
- Plan Boundary
- Disposal Tracts

West Mojave Plan FEIR/S
Map 2-7

Scale: 1 : 410,000

0 5 10 Km

0 5 10 Miles

7/29/04

2.2.1.3 Allowable Ground Disturbance (AGD)

(HCA-27) Establish a one percent threshold for new ground disturbance within the Habitat Conservation Area, applicable for the 30-year term of the West Mojave Plan. New ground disturbance includes any clearing, excavating, grading or other manipulation of the terrain for which a local government permitting process exists, occurring after adoption of the West Mojave Plan whether or not a permanent use is proposed for the site, unless such disturbance is conducted pursuant to existing permitted or vested mining operations. This threshold would be calculated separately for those portions of the HCA under the jurisdiction of each agency or local government participating in the Plan. This acreage would constitute the jurisdiction s *allowable ground disturbance*, or AGD. Once a jurisdiction s or an agency s AGD is exceeded: (1) Private land applicants seeking permits from a jurisdiction must obtain incidental take permits from CDFG and USFWS on a case-by-case basis, and could not utilize the streamlined permitting program established by the West Mojave Plan; (2) Case by case Section 7 consultations may be required to process BLM permits.

- **Continuous Accounting.** Acreage of new ground disturbance would be tracked on a continuing basis, separately for each jurisdiction. Baseline acreage would be set as of time of Plan adoption. The baseline acreage will specifically include those lands subject to existing permits and approvals, as well as those lands included within the scope of vested operations. AGD accounts would be adjusted to reflect transfers of land from the jurisdiction of one agency or government to another.

- **Non-Participating Agencies.** AGD would apply only to projects permitted by agencies participating in the West Mojave Plan. If an agency not covered by the West Mojave Plan approved a project that disturbs HCA lands, the project s ground disturbance acreage would not be deducted from the affected member jurisdiction s available AGD.

- **Habitat Credit Component.** Existing disturbed habitat could be restored, and credits granted which would raise a jurisdiction s AGD ceiling, once specified success criteria have been met.

- **Periodic Review.** Rate of new ground disturbance, effects on wildlife and plant populations and the success of restoration programs would be assessed on a periodic basis and the Plan amended as necessary.

Table 2-6 indicates approximate AGD acreages, by jurisdiction.

Table 2-6
Allowable Ground Disturbance (AGD) by Jurisdiction[1]

JURISDICTION	APPROXIMATE AGD (IN ACRES)
BLM	18,499
Inyo County	No private land in HCA
Kern County	819
Los Angeles County	546
San Bernardino County	4,142
California City	139
Caltrans	1,833

The West Mojave Plan would provide coverage for the Caltans projects listed in Tables 2-6 and 2-12. The 1,833 would serve as the Caltrans Allowable Ground Disturbance. The West Mojave Plan would cover these Caltrans projects so long as total new ground disturbance created by the Caltrans projects does not exceed 1,833 acres. Undisturbed lands located between an existing and new highway alignment would be considered to be disturbed for purposes of calculating the acres to be applied against the CalTrans AGD.

AGD Examples. (1) At the time it adopts the West Mojave Plan, County A has permitting jurisdiction over 150,000 acres of private lands within a tortoise DWMA. The AGD for County A would be 1,500 acres. (2) A new project is approved and constructed within County A. As a result, 250 acres of these lands are disturbed. County A s AGD would be reduced to 1,250 acres. (3) A party successfully restores 300 acres of previously disturbed habitat within the HCA. The AGD for County A would be increased to 1,550 acres.

2.2.2 Compensation Framework

2.2.2.1 Administrative Structure

(HCA-28) The agencies participating in the West Mojave Plan would establish an Implementing Authority to oversee the implementation of the habitat conservation plan. This authority would be established through an interagency agreement (such as a memorandum of agreement or MOA) or a Joint Powers Agreement as determined by the agencies participating in the plan. This agreement would define the composition of the governing board for the authority.

It is expected that the governing board would be composed of elected officials representing the cities and counties as well as representatives of the BLM, Caltrans, and other public entities signatory to the agreement. USFWS and CDFG would participate on the governing board as ex officio, non-voting members. Staff reporting to the governing board would conduct day-to-day oversight for implementation.

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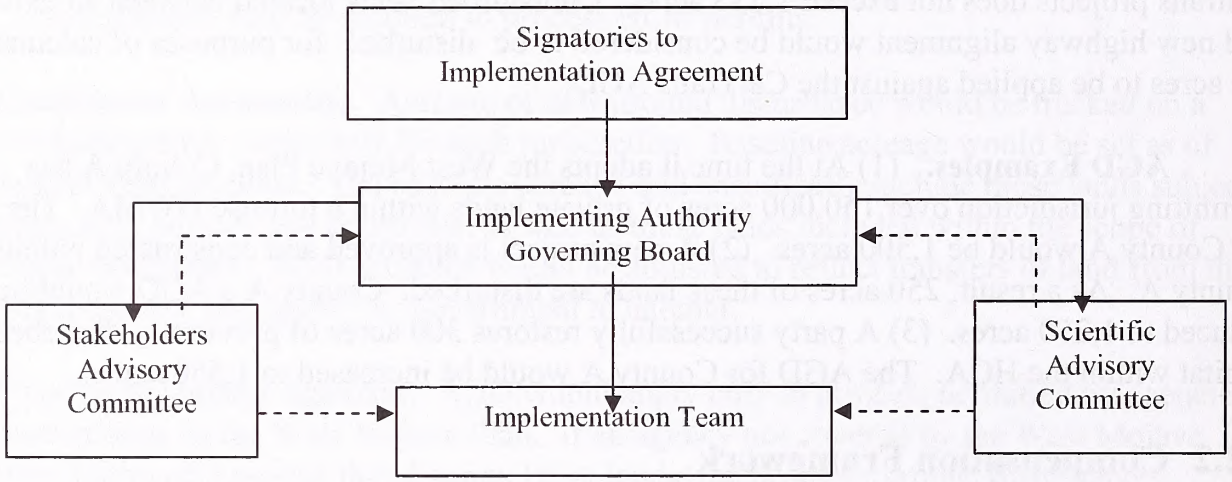
1 AGD acreage figures are approximate. Final AGD would be calculated prior to issuance of Biological Opinion and Section 10(a) permits.

The Implementation Team would be physically located in an office in the West Mojave planning area to facilitate communication and to provide a single location for public contact on plan issues. USFWS and CDFG may consider co-locating their staff with the Implementation Team to further facilitate communication and streamlining of the permit process.

In addition, two advisory committees would be established. A Stakeholders Advisory Committee would advise staff and the Governing Board on issues affecting the various interest groups and general public. A Scientific Advisory Committee would provide professional, scientific review and advice to the Implementation Team and Governing Board. The composition and duties of the Governing Board, Implementation Team, and advisory committees are detailed in Figure 2-1.

Figure 2-1
Implementation Structure



2.2.2.2 Mitigation Fee

(HCA-29) To replace the existing array of complex and time-consuming mitigation formulas, enhancement and endowment fees (including the current CDFG endowment fee), and survey requirements, a single mitigation fee would be established as compensation for habitat disturbance within the West Mojave planning area. The fee would apply to new ground-disturbing activities located on public and private lands under the jurisdiction agencies participating in the HCP including the BLM, Caltrans, cities, counties and special districts. This mitigation fee would be based on the average value of an acre of the private lands to be acquired for the implementation of this plan. The average value would be determined prior to finalization of the Implementation Agreement.

There would be three levels of compensation. Within the Habitat Conservation Area the fee would be based on a compensation ratio of 5:1 (five times the average value of an acre of land within the HCA). Outside of the HCA on lands delineated as disturbed habitat, the mitigation fee would be based on a compensation ratio of 0.5:1 (one half the average value of an acre of land within the HCA). Within all other areas outside of the HCA, the mitigation fee

would be based on a 1:1 compensation ratio. The criteria utilized to delineate disturbed habitat is shown in Table 2-7. Map 2-8 graphically displays the three compensation areas.

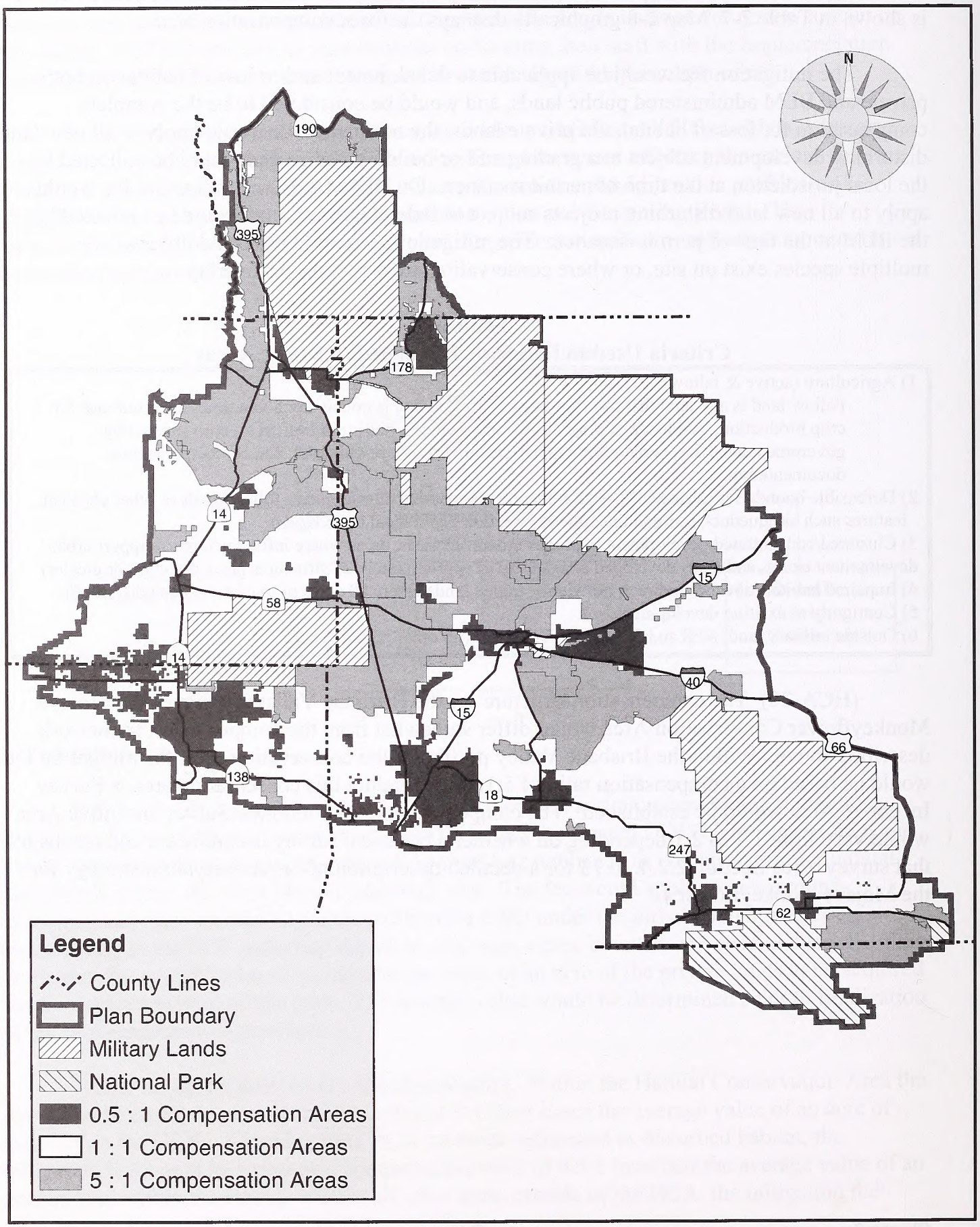
The mitigation fee would be applicable to development and/or loss of habitat on both private and BLM administered public lands, and would be considered to be the complete compensation for loss of habitat. On private lands, the mitigation fee would apply to all new land disturbing development subject to a grading and/or building permit and would be collected by the local jurisdiction at the time of permit issuance. On BLM lands, the mitigation fee would apply to all new land disturbing projects subject to federal permits, and would be collected by the BLM at the time of permit issuance. The mitigation fee would not be additive where multiple species exist on site, or where conservation areas for species overlap.

Table 2-7
Criteria Used to Delineate Disturbed (0.5 to 1) Areas

1) Agriculture (active & fallow) Fallow land is any land that has ever been cultivated and is not, at any given time, in current use for crop production. Evidence of prior cultivation includes, but is not limited to, crop surveys by government agencies, aerial photographs, statements by eyewitnesses, and contemporaneous documentation.
2) Defensible boundaries (nearest 1/4 section lines encompassing development; follow roads or other physical features such as aqueduct, railroad line, power line; don t split legal boundaries)
3) Clustered/concentrated development (includes urbanized areas, areas where infrastructure to support urban development exists, and areas developed at a density of approximately 25 structures per 1/4 section or greater)
4) Impaired habitat (direct & indirect; not viable; mined lands where 80 acres or more have been disturbed)
5) Contiguity to existing development
6) Outside military land, NPS and State Parks boundary (no other jurisdiction)

(HCA-30) The compensation structure for the Brisbane Valley portion of the Mojave Monkeyflower Conservation Area would differ somewhat from the compensation framework described above. Within the Brisbane Valley portion of the conservation area, the mitigation fee would be based on a compensation ratio of 5:1. Surrounding this conservation area, a Survey Incentive Area would be established. The compensation ratio within the Survey Incentive Area would vary from 1:1 to 2:1 depending on whether a botanical survey is conducted and results of that survey. (See Section 2.2.4.10.13 for a detailed description of the conservation strategy for the Mojave monkeyflower.)

Fee Compensation Areas



West Mojave Plan FEIR/S
Map 2-8

Scale: 1 : 1,750,000

0 10 20 30 Km

0 10 20 30 Miles

7/29/04

(HCA-31) A different method of compensation would be utilized for mining projects within the Carbonate Endemic Plants management area. The provisions of compensation for take of undisturbed habitat in this area are described in the separate interagency Carbonate Habitat Management Strategy (CHMS). The CHMS provides incentives for donations, land exchanges and conservation of occupied habitat, and applies a 3:1 mitigation ratio for compensation lands to replace habitat lost to mining. Non-mining projects within the management area would follow the mitigation fee provisions of the West Mojave Plan.

Certain uses would be exempt from the established mitigation fee. The development of a single-family residence on a lot of record outside of the HCA, and maintenance activities within an existing and previously improved road or utility right-of-way, are examples of uses exempt from payment of the mitigation fee. A complete listing of uses exempt from fee payment on private land is displayed in Table 2-8. Uses exempt from the mitigation fee on BLM administered land are shown in Table 2-9.

Table 2-8
Activities/Uses Exempt from Fees on Private Land

EXEMPT ACTIVITIES AND USES
• Single family residential dwellings and associated accessory structures, including non-discretionary second dwelling units that are permitted pursuant to California state law. Exemption applies to single family residential dwellings and non-discretionary second dwelling units on legal lots of record created prior to (date of enactment of fee ordinance). Residential construction on lots created after (date of enactment of fee ordinance) would be subject to the fee. This exemption does not apply within the Habitat Conservation Area.
• Remodels and renovations totaling no more than 25% of pre-existing development. (Note: Fee applies only to those classes of construction that generally represent new ground disturbance.)
• Demolitions
• Mobilehome replacements and reconstruction of any structure damaged or destroyed by fire or other cause.
• Maintenance activities within an existing and previously improved road or utility right-of-way. For the purposes of this section, maintenance includes paving, repaving, grading, and laying of gravel or other base, as long as these activities take place within an already graded road right of way.
• Any project for which a discretionary or ministerial approval was granted by the local jurisdiction prior to (date of enactment of fee ordinance), and any project for which a Vesting Tentative Map or Development Agreement approved prior to (date of enactment of fee ordinance) confers vested rights under a local jurisdiction ordinance or State law to proceed with development. Projects subject to this exemption must comply with all provisions of State and Federal law. (Note: This exemption is intended to apply to already approved projects where the application of subsequently adopted fees would be in conflict with State law.)
• Development that has already obtained required permits from the State Department of Fish and Game and/or U.S. Fish and Wildlife Service.
• Any project occurring on an area that was legally paved, landscaped, or graded and covered with a base prior to adoption of the West Mojave Plan.

Table 2-9
Activities/Uses Exempt from Fees on BLM Land

EXEMPT ACTIVITIES AND USES
• Any project included on the BLM CX List (list of Categorical Exclusions) as incorporated into the DOI NEPA manual at 516 DM6, Appendix 5, Section 5.4 (effective 5/19/92), unless the project is found to have adverse effects on species listed or proposed to be listed on the List of Endangered or Threatened Species, or have adverse effects on designated Critical Habitat for these species (Exception 2.8, DOI NEPA manual at 516DM2, Appendix 2 [effective 9/26/84]). • Any project for which required permits from the U.S. Fish and Wildlife Service were obtained prior to the Record of Decision for the West Mojave Plan. • Any project for which habitat compensation requirements were established prior to the Record of Decision for the West Mojave Plan. Any such project would comply with the mitigation requirements established through the NEPA process. • Any project accomplished by the BLM, or its authorized agent, to implement provisions of the West Mojave Plan.

On private lands, the mitigation fee would be based on the size of the parcel to be developed. Development on parcels less than one acre in size would be charged on a pro rata basis. The mitigation fee for residential development on parcels between one acre and 2 ‰ acres in size will be based on either one acre of development that represents the typical amount of direct disturbance for rural residential land use on 2 ‰ acres parcels within the Plan area, or the actual amount of grading associated with the individual residential project, whichever is greater. Commercial and industrial development will pay a mitigation fee for the actual acreage to be disturbed in the same manner as development on parcels greater than 2 ‰ acres in size. The fee for projects on private land parcels greater than 2 ‰ acres may be calculated by determining the acreage of land actually disturbed, if steps are taken by the project proponent to ensure that the remainder of the parcel would remain undisturbed (e.g. the project area is fenced off from the remainder of the parcel and a conservation easement is granted for the remaining land). For projects occurring on public land, the mitigation fee would be based on the total acreage of land to be disturbed.

(HCA-32) In order to identify the loss or disturbance of habitat without compensation, a base line aerial photo data set would be established to identify those properties that were developed prior to the adoption of the Plan. An owner of property that is developed subsequent to the adoption of the plan would be subject to payment of the mitigation fee. Although no fee would be required for agriculture and other uses that do not require a development or building permit, the conversion of existing agricultural land, either under current cultivation or fallow, to any use that requires a development or building permit would be subject to the mitigation fee.

Administration of Mitigation Fees: An Implementing Authority established by agreement among the participating jurisdictions would administer mitigation fees collected on private lands. Mitigation fees collected on BLM lands would be managed by the BLM and maintained in a special account established for the acquisition of mitigation lands within the HCA, as well as for monitoring, enhancement and management of those lands. Appendix C (Implementation Plan) identifies priorities for the acquisition of land within the HCA.

Mitigation funds could also be expended on other implementation measures established by the Plan. Appendix C lists those measures and provides an initial prioritization for implementation. The Implementing Authority and BLM would coordinate the acquisition of mitigation lands and funding of other measures after reviewing and adjusting as necessary the Land Acquisition Priority Map and Implementation Priority Table. The interagency agreement establishing the Implementing Authority and the Implementation Agreement with the wildlife agencies would provide the specifics regarding the Implementing Authority s decision making process and coordination responsibilities to ensure that lands and measures most critical to species conservation are acquired or implemented early on.

2.2.2.3 Habitat Rehabilitation Credits

(HCA-33) Habitat Rehabilitation Credits (HRCs) would be awarded to a person or entity that successfully rehabilitates degraded habitat of covered species. The West Mojave Implementation Team would identify degraded habitat suitable for rehabilitation. Rehabilitation sites would be located within the Habitat Conservation Area. Successful rehabilitation would be determined by whether rehabilitation success criteria are attained. The Implementation Team would make this determination, following consultation with the Scientific Advisory Panel. HRCs are considered a secondary means to mitigate impacts, and should not result in extensive areas of re-created habitat that are intended to functionally replace previously undisturbed habitat.

Award and Use of HRCs: The West Mojave Implementing Authority would award HRCs, following the determination by the Implementation Team that success criteria have been attained. One HCR would be awarded for every acre of land restored. An award of HRCs would have two results:

- The AGD for the entity having jurisdiction over the rehabilitated lands would be increased immediately, by one acre for every HRC awarded.
- The person or entity to which the HRC was awarded is designated as the holder of that HRC. The holder may take the following actions concerning the HRC: (1) retain the HRC for future use; (2) transfer the HRC to another person or entity; or (3) when compensating for any new ground disturbance, apply the HRC to reduce the required compensation.

The reduction of required compensation would be accomplished by applying the following formula:

$$\text{Compensation} = ((\text{CR} \times \text{DA}) - (\text{Number of HCRs})) \times \text{L}$$

CR is the applicable compensation ratio, DA is the number of disturbed acres, and L is the average cost of land within the HCA. Examples of the application of an HRC to reduce compensation ratios are presented in Box 2-1.

Tracking HRCs. The Implementation Team would maintain a record of all HRCs awarded by the Implementing Authority.

Projects Not Eligible for HRCs. Habitat Rehabilitation Credits would not be awarded for revegetating sites disturbed by new projects. Revegetation is currently a standard requirement for mitigating ground disturbing impacts. Pipeline proponents, for example, are typically required to salvage and replant cacti and *Yucca* species, stockpile topsoil, scarify the ground (i.e., usually imprinting), redistribute the topsoil over the impact area, reseed the disturbed right-of-way with locally collected seed stock, and in some cases apply mycorrhizal spores over the disturbed area. This is current management, and successful mitigation along such a pipeline would NOT be eligible for an award of HRCs.

Box 2-1
Application of HRCs

Example 1. Smith proposes a two-acre project within the HCA. Smith holds three HRCs. Assume L is $500. Smith applies all three credits. The compensation is ((5 x 2) - 3) x $500, or $3,500.

Example 2. Jones proposes a ten-acre project within the disturbed fee zone. Jones holds three HRCs. Assume L is $500. Jones applies all three credits. The compensation is ((0.5 x 10) - 3) x $500, or $1,000.

The acquisition of land from private landowners and its donation to a jurisdiction or agency, or its placement under a conservation easement or other conservation management, is not eligible for an award of HRCs. Only those activities that rehabilitate degraded habitat in a manner that meets the rehabilitation success criteria may earn HRCs.

Identification of Degraded Habitat: The Implementation Team would determine whether a property constitutes degraded habitat eligible f or an award of HRCs. This may be done proactively by the Implementation Team, which could identify and maintain a list of degraded habitat within the HCA. Alternatively, a project proponent may propose a site for rehabilitation. The Implementation Team would then determine whether the proposed site is an acceptable candidate for rehabilitation, and whether it is appropriately situated within the HCA.

If a project proponent seeks to rehabilitate lands to mitigate a specific project (rather than to prospectively rehabilitate degraded habitat and bank the HRCs for future use), the rehabilitation site should be located in a region where species affected by the project would be benefited. Where a person or entity wishes to earn HRCs as a form of mitigation banking, it is still important that the rehabilitation sites occur within regions where there is the greatest net benefit to the conservation of covered species in that area.

Goals. Once the Implementation Team identifies degraded habitat, the person or entity seeking HRCs would employ state of the art rehabilitation techniques to realize the following goals:

- *Goal 1.* If the intent is to mitigate on-site impacts to one or more covered species, rehabilitation off-site must benefit those same species. If the intent is to obtain and hold HRCs as a form of banking, the site must be rehabilitated so that success criteria for that region and its covered species are being met.

- *Goal 2.* The short-term goal is to eliminate existing conditions that are not conducive to species conservation and recovery. This may entail (a) eliminating mine pits, trash dumps and other existing conditions that adversely affect covered species; (b) visually reducing or eliminating the impact area so that it is not targeted for additional human uses that are not conducive to conservation of covered species (i.e., use of an old mine site as a motorcycle play area); (c) securing the soil through scarification, imprinting, or other methods to reduce the amount of fugitive dust; and (d) eliminating hazardous materials from old mine and other sites where the contaminants are potentially adversely affecting covered species.

- *Goal 3.* Long-term goals include (a) restoring vegetation native to the area in the relative same species composition, density and cover as found in native, undisturbed habitats adjacent or nearby; (b) rehabilitating the site so that other constituent elements become re-established (i.e., provide for natural topsoil cover, replenish the seed bank of native plant species, regrowth of mycorrhizal fungi, etc.); and ultimately, (c) providing conditions that would result in the use of the site by covered species. Rehabilitation that results in establishing fields of non-native species such as mustards (i.e., *Descurania* ssp., *Sisymbrium* ssp., etc.) or Russian thistle (*Salsola tragus*) does not satisfy these goals, as these exotic species are seldom associated with occupied habitats of most covered species. The ultimate success of rehabilitation should be judged, in part, by reoccupation of the site by the targeted covered species.

Any successful rehabilitation project should ultimately reflect pre-disturbance conditions, which should, in most cases, be judged relative to non-degraded habitats immediately adjacent to the site. Creating conditions that support native biodiversity, and maintaining such sites so that they eventually function has habitat for covered species, are two components of successful rehabilitation.

Unique features that provide crucial habitat components for covered species should not be ignored. If Joshua Trees, for example, are a component of adjacent undeveloped habitats, rehabilitation should strive to replace them on the site at densities similar to adjacent areas.

Success Criteria: The following success criteria must be met prior to an award of HRCs. The West Mojave Implementation Team, in consultation with the West Mojave Scientific Advisory Panel, would determine whether these criteria have been attained.

- *Sustainability.* Native vegetation should maintain/replace itself over time. The vegetation should not be dependent on artificial water, fertilizers, or labor (weed removal, etc). Recruitment of native plants or production of a viable seed bank are two ways to judge the sustainability of a given rehabilitation site.

- *Resistance to exotics.* Disturbance often lends itself to the establishment of exotic annual plant species. A healthy ecosystem would resist invasion of non-native plants so long as new disturbances are eliminated or adequately curtailed.

- *Nutrient retention.* It is important to keep nutrients in the cycle and avoid having them leak off-site. In the desert most nutrients are tied up in the plant material, and sufficient biomass must be maintained in different age stands and vegetation types (e.g., native annual forbs and perennial shrubs) to enhance and maintain nutrient cycling.

- *Full complement of biotic interactions.* Successful rehabilitation should (a) re-establish mycorrhizal associations throughout the affected soil layer; (b) re-establish topsoil and, eventually, soil crusts; (c) attract native pollinators; and (d) provide habitat for natural ecosystem functions (i.e., support everything from key abiotic elements in the soil, soil movers (ants, small burrowing mammals, etc.), and (eventually) the covered species to be benefitted by the rehabilitation effort.

Partial Credit. It may require decades to judge the success of a rehabilitation program, and the process may require the investment of considerable funds before success is achieved. Therefore, as an incentive to undertake and continue the implementation of a rehabilitation program, partial credit would be awarded as certain milestones are met. These milestones follow:

- One-third (1/3) credit would be awarded when all existing structures, pits, and debris are removed; the surface is scarified; the site is reseeded; and salvaged plants are returned to the rehabilitation area.

- Two-thirds (2/3) credit would be applied once the site supports natural ecosystem functions (i.e., perhaps judged by the density and diversity of native plants, the occupation of the site by ants and small burrowing mammals, etc.).

- Full (100%) credit would be awarded once the site supports the targeted covered species and other pertinent criteria are met.

The process would be applied in the following manner:

1. Applicant contacts Implementation Team to determine possible rehabilitation sites.
2. Applicant selects a site, and obtains permission from underlying fee owner to initiate process (BLM or private property owner or other).

3. Applicant submits Rehabilitation Plan to property owner and Implementation Team for review and approval and to obtain any required permits. The Implementation Team would refer the plans to the appropriate land use authority for review and comment.
4. Plan accepted or revisions required by Implementation Team after consultation with the Scientific Advisory Panel.
5. Implementation Team recommends appropriate action to the Implementing Authority on the plan, including the number of credits to be issued upon completion, and the work that must be accomplished in order to obtain partial credits. To approve a proposed rehabilitation plan, the Implementing Authority must find that the proposal is consistent with the goals stated in this section.
6. Applicant initiates rehabilitation work.
7. Once milestones for partial credit are reached, applicant requests a review by the Implementation Team. If Implementation Team, after consultation with the Scientific Advisory Panel, concurs that milestones have been met, then the Implementation Team would recommend to the Implementing Authority that it award the partial HRCs to the applicant.

2.2.3 Incidental Take Permits

2.2.3.1 Covered Activities and Terms of Permits

Alternative A assumes that Section 10(a) and Section 2081 incidental take permits would be issued to participating cities, counties and special districts, for a term of thirty years. Activities covered by the permits could include Caltrans projects, utility maintenance activities, private activities subject to the permitting authority of a participating city or county, public activities undertaken by a participating city or county, and expansions of mining operations pursuant to vested rights. Incidental take permits do not cover activities on public lands, which are addressed by Section 7 consultations. Caltrans would also need to com ply with Section 7 requirements for projects involving federal funds.

An incidental take permit covers only those activities that are subject to a building or development permit from a participating agency. If a non-covered activity is expected to result in the take of a listed species, the project proponent must obtain a separate take permit from the USFWS and/or CDFG.

Activities covered and not covered by the permits are listed in Table 2-10.

Table 2-10

Activities Covered And Not Covered By The Incidental Take Permit
Covered Activities include: • Private activities subject to the permitting authority of a city or county participating in the HCP. (Examples: building permits, conditional use permits, and subdivisions.) • Public activities undertaken by a participating city or county. (Examples: road improvement projects, construction of public buildings.) • Specified Caltrans maintenance activities (See Appendix W) and projects. • Activities on public lands. • Utility maintenance activities, raven nest removal and potential raptor electrocutions Activities Not Covered include: • Public and private activities undertaken or permitted by agencies not participating in the HCP. • Private activities not subject to a development or building permit or other form of entitlement, unless such activities are conducted pursuant to valid non-conforming uses or vested rights. This may include the following examples: Agricultural uses such as row, field and tree crops Land grubbing and clearing Weed abatement Construction of certain accessory structures

2.2.3.2 Treatment of Unlisted Species and Federal No Surprises Assurances

All unlisted species addressed by the West Mojave Plan would be covered by the Section 10(a) permit, and added to the Section 2081 permit should they be listed in the future. In this manner, it is the intent of this Plan to obviate the need for listing these species in the future. To provide an incentive for implementing conservation strategies, including programs for unlisted species, USFWS offers federal no surprises assurances to parties seeking incidental take permits.

The USFWS adopted its no surprises policy to allow perm ittees to remain secure regarding the agreed upon cost of conservation and mitigation set forth in the Section 10(a) permit. If the status of a species addressed by an HCP unexpectedly worsens, the primary obligation for implementing additional conservation measures would be the responsibility of the Federal government or non-federal landowners who have not yet developed an HCP.

No surprises assurances can be issued for unlisted species. Providing that the HCP is being properly implemented and the species was adequately covered by the conservation plan, the protections provided by the assurances would apply even in the event the unlisted species is later listed. USFWS may ask a permittee to voluntarily address a problem, but it cannot demand such assistance. In the event such assistance is not forthcoming, USFWS may address the problem with its own funds.

These assurances can be issued only to incidental take permittees. They do not apply to federal lands, nor can they be issued to federal agencies, such as the BLM. Should conditions change, federal agencies can be required to take additional actions to protect a species.

The 2081 permit authorizes the take of species listed by the State of California. Should an unlisted species that is covered by the Plan become listed, the species could be authorized for take but only if the CDFG makes an independent finding that the species protection measures in place under the permit still provide for full mitigation of impacts to the species, and that the conservation measures continue to be adequate given the status of the species at the time of listing.

In the event that a species not covered in the Plan is subsequently proposed to be listed as threatened, rare, or endangered under FESA or CESA, USFWS and CDFG shall provide at least sixty (60) days notice to the permittees and meet with them prior to taking action on the listing proposal to ascertain whether this Plan and the environmental documentation for it shall be deemed to be adequate and appropriate documentation to support an application for a takings permit. USFWS and the permittees shall deem the Plan and accompanying environmental documentation adequate for the species so long as the species habitat is adequately protected in the conservation areas, and the Plan is being properly implemented. CDFG would need to determine that the Plan meets all of the permit issuance criteria for that particular species, and that the permit would need to be amended to authorize incidental take. In that event, the application for revised incidental take permits to cover the additional species shall be treated by USFWS and CDFG as a Draft HCP that has been prepared in compliance with applicable state and federal laws, and shall treat the environmental assessment as an adequate environmental document under CEQA and NEPA to support the issuance of incidental take permits. If the finding is made that the species proposed for listing is not adequately protected by the conservation areas, USFWS and CDFG shall cooperate with the permitees to identify additional conservation measures that would be necessary to amend the Plan and incidental take permit applications to include the proposed species.

2.2.3.3 Take Authorized by Incidental Take Permits

Table 2-11 indicates the take to be authorized for each covered species and the conservation measures that are intended to minimize and mitigate the take. Take for all listed species other than desert tortoise is specified as either acres of habitat or number and location of known occurrences. Take would also be permissible for new occurrences found on private land outside the Habitat Conservation Area. Conservation efforts would keep pace with take, and habitat losses will not be allowed to outpace on-the-ground mitigation work. This will require tracking new ground disturbance. A mechanism to ensure that take does not outpace conservation will be included in the Implementing Agreement.

The permits would authorize take of listed species on private land outside the Habitat Conservation Area, subject to provisions of monitoring and adaptive management. Species not

currently listed cannot be authorized for take until they are listed. The Plan, however, can treat them as if they are listed and include them as covered species. Baseline data for many species is incomplete and an exact acreage of habitat subject to incidental take cannot be calculated.

A few of the unlisted species would not be exempt from additional biological surveys outside HCAs. These are bats and the burrowing owl under specified conditions, and two plant species in specified areas (Little San Bernardino Mountains gilia, triple-ribbed milkvetch). Incidental take for these plants and animals is limited, and additional take is dependent on survey results in the future.

Take of Desert Tortoises: All lands developed within tortoise DWMAs and in tortoise survey areas outside of tortoise DWMAs would constitute authorized loss of habitat (i.e. take), whether occupied or not. Development of No Survey areas would be tracked, but authorized development would not constitute loss of habitat (i.e. take).

Table 2-11
Authorized Take Of Species

SPECIES	AUTHORIZED TAKE	HABITAT CONSERVED
Alkali mariposa lily	Take allowed within Lancaster city limits and on private lands outside of conserved populations. Lancaster: 17,051 acres Los Angeles and Kern counties: Unknown portion of 23,810 acres. Isolated sites: Green Springs (Kern Co.), Playas 28-32 and Turner Springs (S. B. Co.)	Los Angeles and Kern counties: 23,810 acres from interim conservation areas plus 3,629 acres in Habitat Conservation Area. Isolated sites: Paradise Springs, Box S Springs, Cushenbury Springs, and Rabbit Springs. The Plan recognizes the significant conservation now present at Edwards AFB, which encompasses the majority of the range within the West Mojave.
Barstow woolly sunflower	Take would be allowed within the Barstow city limits and on private lands throughout the range. Very low amount of take possible within utility corridors. Lands within the HCA subject to 1% cap on allowable ground disturbance.	North Edwards Conservation Area totals 14,337 acres. New ACEC within the Fremont-Kramer DWMA totals about 36,211 acres.
Bats California leaf-nosed bat, Townsend s big-eared bat	Take of bats and their roosting habitat limited to sites harboring ten or fewer bats. Incidental take permits would not cover the loss of significant roosts. Specific procedures must be followed for surveys and to allow for safe exit of bats.	Eight significant roosts on BLM lands. The Plan recognizes conservation of nine significant roosts on military lands. New discoveries of significant roosts conserved on case-by-case basis.
Brown-crested flycatcher	No take anticipated.	All riparian habitat in the Mojave River if groundwater criteria are met. All riparian habitat at Mojave Narrows Regional Park, Cushenbury Spring and Big Morongo Canyon ACEC. All riparian potential habitat at Big Rock Creek HCA.

SPECIES	AUTHORIZED TAKE	HABITAT CONSERVED
Burrowing owl	Take (eviction from burrows) allowed within city limits and in County urban areas. No direct take (killing) of any owls.	Acquisition of occupied habitat in Antelope Valley, along Mojave River, and possibly Brisbane Valley. Conservation must match take on an annual basis.
Carbonate endemic plants Cushenbury buckwheat, Cushenbury milkvetch, Cushenbury oxytheca, Parish s daisy, Shockley s rockcress	Take of the species would be allowed outside the ACEC boundaries and west of Highway 18. Take of Parish s Daisy would be allowed in Yucca Valley city limits.	New ACEC east of Highway 18. Grazing exclosures constructed in Rattlesnake Canyon cattle allotment. Compliance with interagency Carbonate Habitat Management Strategy.
Charlotte s phacelia	Take allowed on private and public lands outside ACECs, Wilderness and El Paso Mountains. No substantial take anticipated; take limited to 50 acres.	Managed in El Paso Mountains by route designation. Protected within Sand Canyon and Short Canyon ACECs. Protected within Owens Peak Wilderness. Protected within Red Rock Canyon State Park.
Crucifixion thorn	Take allowed on private land within its range, as long as it does not degrade the conservation areas. Only two private land point occurrences are known.	All known occurrences on public land. Point occurrences near Pisgah Crater and crucifixion woodland south of Fort Irwin.
Desert cymopterus	Take allowed on private land outside DWMAs and North Edwards Conservation Area. Take limited to 50 acres.	Avoidance of all occurrences on public land in DWMAs. All lands within North Edwards Conservation Area, subject to 1% AGD.
Desert tortoise	1% Allowable Ground Disturbance in the Tortoise DWMA; this take statement addresses loss of habitat, and it would be necessary to keep track of how many tortoises are actually affected to determine the take of animals. 100% of all tortoises and habitat from the Tortoise Survey Area, including Special Review Areas. Take is not anticipated for the No Survey Area.	All land in DWMAs subject to 1% AGD
Ferruginous hawk	No take of individuals allowed. Take of foraging habitat allowed throughout the planning area.	Plan calls for raptor-safe power lines, addressing the major threat to this species.
Gray vireo	Take allowed on private lands throughout the range. Known sites south of Phelan subject to take.	Conserved within Big Rock Creek Conservation Area, Carbonate Endemic Plants Conservation Area, Joshua Tree National Park. Potential habitat conserved within Bighorn and San Gorgonio Wilderness. Los Angeles County would allow conservation and take on a case-by-case basis within Antelope Valley Significant Ecological Area.

SPECIES	AUTHORIZED TAKE	HABITAT CONSERVED
Inyo California towhee	Take allowed on private land at the edge of the towhee s range, such as at Crow Canyon. Less than 2% of the occupied habitat is on private land. Two water diversions may continue, subject to determination of valid existing rights.	All occupied habitat on public (BLM) lands.
Kern buckwheat	Take only allowed incidental to restoration projects for this species. Very minimal.	Middle Knob ACEC; avoidance of all known occurrences required. Restore specific sites.
Lane Mountain milkvetch	No take on public lands. Take on private lands would be prohibited unless economic use of the parcel is precluded.	All known occupied habitat on public land outside Fort Irwin expansion. Acquisition of private land with occupied habitat.
Least Bell s vireo	No take anticipated.	All nesting habitat in Mojave River if groundwater criteria area met. All nesting habitat at Big Morongo ACEC.
LeConte s Thrasher	Take allowed within all city limits and in all County areas outside the tortoise DWMAs and other HCAs. Development on county lands outside the DWMAs is estimated as 5% of the private lands. Within the HCAs, a 1% limitation on new ground disturbance would limit the acreage of take.	Over 1.5 million acres of occupied habitat conserved within the DWMAs and other HCAs.
Little San Bernardino Mountains gilia	Take allowed on private land in San Bernardino County near Yucca Valley and the community of Joshua Tree, not exceeding 50 acres.	The single known occurrence within Bighorn Wilderness. All occurrences within Joshua Tree National Park. Nearly all known occurrences along secondary drainages outside Park between Joshua Tree and Twentynine Palms.
Long-eared owl	No take of individuals, but take of foraging habitat allowed throughout planning area.	All habitat within the Argus Mountains and Big Morongo Canyon ACEC. All riparian habitat at Big Rock Creek. All known nest sites in other areas.
Mohave ground squirrel	Habitats and resident squirrels outside the MGS CA could be taken; Within the CA, take of habitat and resident squirrels would be authorized on up to 1 percent of the land surface, or 17,235 acres.	All land within the MGS Wildlife Habitat Management Area
Mojave monkeyflower	Take allowed on non-federal land throughout the range. Acreage not determined.	Brisbane Valley = 10,633 acres, all BLM. Eastern Conservation Area = 36,424 acres, including 9,831 acres (27%) private, 25,997 acres (71%) BLM, and 596 acres (2%) State land.

SPECIES	AUTHORIZED TAKE	HABITAT CONSERVED
Mojave fringe-toed lizard	Take allowed at the fragmented populations in the Mojave Valley, along portions of the Mojave River, at El Mirage and Rasor Open Areas and within Twentynine Palms city limits.	Occupied habitat conserved at Sheephole Wilderness and adjacent National Park Service and BLM lands. All known habitat and supporting ecosystem process lands at Big Rock Creek and Saddleback Butte State Park. Occupied habitat on public land conservation area along Mojave River between Barstow and Rasor Open Area. Private land within Mojave River wash. Habitat within Pisgah Crater ACEC.
Mojave River vole	Take allowed for flood control maintenance activities described in existing biological opinion.	All potential habitat in Mojave River outside flood control maintenance areas if groundwater criteria are met.
Mojave tarplant	50 acres of take allowed for new populations found on private land throughout the range. Little development pressure now exists near known occurrences and it is unlikely that large new populations would be found on private land.	Short Canyon ACEC and Cross Mountain. Potential habitat at Red Rock Canyon State Park. Fifty percent of newly detected populations must be conserved.
Nine-mile Canyon phacelia	50 acres of take allowed on private land.	All public land occurrences and 50 percent of newly detected populations.
Parish s alkali grass	No take anticipated. If acquisition of Rabbit Springs is unsuccessful, take allowed on private land as long as 90% of the existing population is conserved.	All known occupied habitat would be conserved, assuming acquisition at Rabbit Springs is successful.
Parish s phacelia	Take allowed on private land within the range of this species but not exceeding 50 acres. About 149 acres of the occupied habitat is found on private land.	Within the Parish s Phacelia Conservation Area are 386 acres (43%) of private and 512 acres (57%) of public land. Occupied habitat on private land proposed for acquisition.
Parish s popcorn flower	No take anticipated. If acquisition of Rabbit Springs is unsuccessful, take allowed on private land as long as 90% of the existing population is conserved.	All known occupied habitat would be conserved, assuming acquisition at Rabbit Springs is successful.
Prairie falcon	No take of individuals unless permitted for falconry by CDFG. Unavoidable take of active nest sites only in non-nesting season. Take of foraging habitat allowed throughout planning area.	All known occupied nest sites.
Red Rock poppy	No take anticipated. 50 acres of take authorized only for newly discovered occurrences on private land.	All known occurrences protected by State Park management and route designation in the El Paso Mountains. Fifty percent of newly detected populations would be conserved.

SPECIES	AUTHORIZED TAKE	HABITAT CONSERVED
Red Rock tarplant	No take anticipated. 50 acres of take authorized only for newly discovered occurrences on private land.	All known occurrences protected by State Park management route designation in the El Paso Mountains. Fifty percent of newly detected populations would be conserved.
Salt Springs checkerbloom	No take anticipated. If acquisition of Rabbit Springs is unsuccessful, take allowed on private land as long as 90% of the existing population is conserved.	All known occupied habitat would be conserved, assuming acquisition at Rabbit Springs is successful.
San Diego horned lizard	Take allowed outside the two major conservation areas.	Big Rock Creek Conservation Area and Carbonate Endemic Plants Conservation Area. Other occupied habitat conserved within Bighorn Wilderness, San Gorgonio Wilderness, and Joshua Tree National Park.
Short-Joint beavertail cactus	Take allowed on private land outside the conservation area boundaries. An estimated 5% of the San Bernardino and Los Angeles County lands would be developed with rural residences over the term of the incidental take permit.	Big Rock Creek Conservation Area. Los Angeles County would review development proposals within the Significant Ecological Areas and provide conservation measures on a case-by-case basis.
Southwestern pond turtle	Take allowed outside the conserved habitat. This is expected to consist of small tributaries of Amargosa Creek near Palmdale. Take allowed for flood control maintenance activities in portions of Mojave River.	All habitat at Mojave Narrows Regional Park outside flood control maintenance areas, all habitat at Afton Canyon ACEC, Camp Cady Ecological Reserve. Los Angeles County would review proposals within the Significant Ecological Areas (San Andreas Rift Zone) and provide conservation on a case-by-case basis.
Southwestern willow flycatcher	Take allowed by existing biological opinion for portions of the Mojave River.	Migratory stopover habitat conserved at nearly all riparian areas in West Mojave, e.g. east Sierra canyons. All potential habitat at Big Morongo Canyon ACEC. All potential habitat in Mojave River outside flood control maintenance areas if groundwater criteria are met.
Summer tanager	Take allowed (but not expected) at Yucca Valley golf course, Ridgecrest golf course.	All riparian habitat in the Mojave River if groundwater criteria are met. All habitat at Mojave Narrows Regional Park. All habitat at Big Morongo Canyon and Whitewater Canyon ACECs. All riparian habitat at Big Rock Creek HCA. All habitat at Cushenbury Springs and Camp Cady.

SPECIES	AUTHORIZED TAKE	HABITAT CONSERVED
Vermilion flycatcher	Take allowed (but not expected) at Yucca Valley golf course, Ridgecrest golf course, Cerro Coso College.	All riparian habitat in the Mojave River if groundwater criteria are met. All habitat at Mojave Narrows Regional Park. All habitat at Big Morongo Canyon and Whitewater Canyon ACECs. All riparian habitat at Big Rock Creek HCA. Wetlands regulations would protect habitat in Leona Valley.
Western snowy plover	Take of habitat allowed on private lands throughout the planning area. Development pressure on the playa edge-nesting habitat is minimal and sometimes compatible, such as at the former Saltdale site. No known occurrences proposed for incidental take.	Public lands nesting habitat at Searles Lake and Harper Dry Lake ACEC. Private land nesting habitat conserved at Searles Lake according to agreement with CDFG. Other private land nesting areas protected during nesting season.
Western yellow-billed cuckoo	No take anticipated.	All riparian habitat in Mojave River if groundwater criteria are met. Migratory stopover habitat in east Sierra canyons. Riparian potential habitat on public lands in Kelso Valley.
White-margined beardtongue	Take would be allowed for maintenance of existing facilities within the BLM utility corridor and on private land within its range. Limited to 50 acres of occupied and potential habitat.	All known occurrences in washes south of Cady Mountains. Known occurrences within the proposed Pisgah Crater ACEC.
Yellow-breasted chat	No take anticipated.	All habitat at Cushenbury Springs, Mojave Narrows Regional Park, Big Morongo Canyon and Afton Canyon ACECs, Camp Cady. Potential habitat at Big Rock Creek HCA.
Yellow warbler	No take anticipated.	All habitat in east Sierra canyons. All habitat at Big Morongo Canyon, Whitewater Canyon, Sand Canyon, and Afton Canyon ACECs. All habitat at Camp Cady and Mojave Narrows Regional Park. All riparian habitat in the Mojave River if groundwater criteria are met. All riparian habitat at Big Rock Creek CA.
Yellow-eared pocket mouse	Limited to 100 acres of occupied and potential habitat. Private lands throughout the range. Development expected to be minimal.	Sand Canyon, Jawbone-Butterbredt ACECs. Potential habitat within Short Canyon ACEC, Owens Peak and Kiavah Wilderness, Kelso Valley Monkeyflower Conservation Area.

2.2.3.4 Military Lands

Lands managed by the Department of Defense provide important conservation benefits for many covered species. The current management of these lands has been considered in the development of the boundaries and management of the HCA. However, the Department of Defense cannot commit management of its lands in perpetuity to conservation purposes because the mission of the installation could change at any time and thereby alter the degree of conservation that may occur within an area. Therefore, the primary burden of ensuring the conservation of species would fall on the public lands and other areas that are managed for this purpose. If the mission of an installation changes in a manner that would reduce the level of species conservation, the West Mojave participating agencies would evaluate whether these changes would require a change in management within the HCA to ensure the survival and recovery of the affected species.

2.2.4 Species Conservation Measures

Alternative A proposes ecosystem-scale conservation with the establishment of four very large DWMAs and additional lands for the Mohave Ground Squirrel Conservation Area. The tortoise and Mohave ground squirrel are umbrella species, a term used to describe protection of many other species under the umbrella of conservation for important wide-ranging species. The size of the DWMAs and Mohave ground squirrel conservation lands insures adequate protection for selected plant communities, and for common and unique elements of the desert flora and fauna. The focus on conservation of threatened and endangered species sometimes neglects the importance of maintaining viable populations of the common species, which function in the ecosystem as food plants, prey, pollinators, seed dispersers, or regulators of population size. Protection of species at all levels (trophic levels) of the food pyramid or web recognizes the interdependency of species that is the basis of ecology, and makes conservation of selected rare and endangered species easier, since ecosystem components are kept intact.

Several narrow endemic plant species are found within the DWMAs and Mohave Ground Squirrel Conservation Area. These include Mojave monkeyflower, Barstow woolly sunflower, desert cymopterus and Lane Mountain milkvetch. Other plants found as local disjuncts (occurring at locations outside their primary range) are protected within the DWMAs, including Parish's phacelia, white-margined beardtongue, and crucifixion thorn. The desert tortoise and Mohave ground squirrel habitat umbrella effect thus is intended to preserve several diverse and unique elements of the western Mojave Desert flora. An additional protection measure for these species is take limitation of 50 acres. The take limitation could be revised based on results of monitoring and on adaptive management.

The large conservation land base also protects unique and declining wildlife, particularly the LeConte's thrasher, Bendire's thrasher, Mojave fringe-toed lizard, many species of bats, and the golden eagle and prairie falcon.

Despite the benefits of large conservation areas, HCPs must also provide for the protection of special sites that support unusual communities or restricted-range species. Alternative A establishes several smaller conservation areas to insure that locally important sites are conserved. In addition, linkages to the National Forests, National Parks, and other conserved landscapes outside the plan boundaries are also important to maintain ecosystem integrity within both jurisdictions.

Protective management prescriptions are an integral component of the West Mojave Plan s habitat conservation strategy. A prescription could include take avoidance m easures intended to minimize the impacts of a new development, as well as proactive management programs to be undertaken by land management agencies (for example, raven control at head starting sites).

Management prescriptions identified below are intended to *minimize* direct and indirect impacts associated with authorized development and land uses, and *mitigate* the impact by establishing conservation areas, collecting compensation fees and managing those areas for species recovery and conservation. Minimization measures are those actions that reduce the level of impact onsite, while mitigation measures are those actions that provide for species conservation offsite.

Minimization measures are those that occur at the construction site or in association with an authorized land use, and are generally referred to as *take avoidance measures.* For site development, minimization measures have included take avoidance measures, such as awareness programs, clearance surveys, site delineation, fence installation, reduced speed limits, and onsite biological monitoring. For authorized land uses, such as a dual sport event, minimization measures have included awareness programs, route delineation, seasonal restrictions, regulated speed limits, and monitoring. The intent of these measures is to minimize the onsite impact associated with the authorized activity.

Mitigation measures are those that occur in appropriate habitats offsite to offset the loss or degradation of habitat resulting from the authorized activity. Proactive management programs are considered one form of mitigation. Mitigation measures have included offsite habitat acquisition and management of those lands for the conservation of the affected species.

2.2.4.1 Species Conservation Measures Applicable Throughout the HCA

Agriculture: (HCA-34) The conversion of habitat to those agricultural uses that are allowed by the local agency without issuance of a discretionary permit is exempt from payment of the compensation fee described above. If conversion would result in take of species listed by the state or federal government, then appropriate permits must be obtained from the CDFG and/or the USFWS. The Plan would not cover this activity.

Fire Management: Current management and implementation of future adaptive management actions are considered sufficient. Current Management includes the following:

- Wildland fire management should be allowed in all management areas.
- Fire suppression should be a mix of aerial attack with fire retardant, crews using hand tools to create firebreaks, and mobile attack engines limited to public roads and designated open routes.
- Use of earth-moving equipment or vehicle travel off public roads and designated open routes should not be allowed except in critical situations where needed to protect life and property.
- Incoming fire crews unfamiliar with habitat protection should receive an awareness program to minimize impacts.
- Post-suppression mitigation should include rehabilitation of firebreaks and other ground disturbances using methods compatible with management goals.
- Emergency route designation may be required to direct vehicle use to identified routes and minimize impacts, such as vehicle-induced erosion, to the recovering habitat.

Highways: (HCA-35) In general, there would be no new paved highways in DWMAs, except for the projects listed in Table 2-12. The West Mojave Plan would provide coverage for the projects listed in Table 2-12, and that acreage (1,833 total) would serve as the CalTrans Allowable Ground Disturbance (see section 2.2.1.3). Additional proposals for paved roads would not be covered by the West Mojave Plan, and would be subject to separate consultations.

Table 2-12
Caltrans Highway Improvements Within the HCA

Highway	County	Acres Disturbed in HCA
SR 190	Inyo	0
US 395	Inyo	1 (Rehabilitate roadway)
US 395	Kern	0
SR 14	Kern	0 (within existing R/W)
SR 138	Los Angeles	[illegible]
SR 178	San Bernardino	0
US 395	San Bernardino	[illegible]
US 395/SR 58 Junction	San Bernardino	1466 acres of new R/W
SR 58	San Bernardino	258
I-15	San Bernardino	69
I-40	San Bernardino	3

Highway	County	Acres Disturbed in HCA
I-40 Rest Area	San Bernardino	5
SR 247	San Bernardino	24
SR 62	San Bernardino	0

Land Acquisition Within the HCA: (HCA-36) The primary goals for land acquisition are to maintain existing public lands insofar as possible in an unfragmented state, to acquire private lands for conservation purposes in the HCA, and to manage those areas for species recovery. Insofar as possible, the Implementation Team would utilize the following criteria to determine the priority for acquisition of private land within the HCA:

Non-biological Criteria:

- Private lands surrounded by public lands are preferred over lands adjacent to private property.
- Undisturbed lands are preferred over disturbed. Exceptions may be made for HCA lands that are currently threatened by certain uses.
- Lands threatened by development, often at the edge of the HCA, are preferred over lands with little or no threats. Higher priority would be given to HCA lands closer to existing development.
- Lands with willing sellers or in large parcel sizes are preferred over small lots.
- Parcels within the LTA consolidation zone are preferred over those that are not.
- Parcels that facilitate other programs, particularly motorized vehicle access by the public, law enforcement, fencing, signing, raven and feral dog management would receive a higher priority than those not contributing to these management programs.
- Cost.

Biological Criteria:

- Lands with known occurrences or high tortoise sign counts are preferred over lands containing only suitable habitat.
- Areas containing several species are preferred over areas with a single species.

The land acquisition process would seek to maintain the stability of local tax bases. The goal would be to assure that there would be no net loss of the total assessed valuation of private

lands within the planning area. Acquisitions would be from willing sellers only. With prior approval by the Implementation Team, conservation easements may be used as an alternative to land acquisition.

Lands acquired by the BLM that are within the external boundaries of an ACEC become a part of the designated ACEC upon acquisition without further CDCA Plan amendments.

Acquisition of private lands within the HCA must be followed immediately by meaningful land management actions (e.g., route designation, biological monitoring and implementation) that satisfy pertinent laws and promote the conservation and recovery of the target species.

Mining Exploration Access: (HCA-37) Use of earth-moving equipment or vehicle travel off public roads and designated open routes would not be allowed except under a BLM-approved Plan of Operations for exploration activities conducted in accordance with the General Mining Law of 1872. The operations would meet the requirements of all applicable federal, State of California, and county laws and regulations, including applicable regulations set forth in 43 CFR 3809.1-3.

(HCA-38) Exploration drilling and the development of access routes to drill sites are considered temporary disturbances. If the access route is closed within one hundred twenty (120) days of commencement of surface-disturbing activities, all such activities are appropriately monitored to minimize impacts as they occur, and any surface disturbance at the drill site is reclaimed, these activities would not be counted against the one percent AGD for the HCA. Temporary disturbances would be counted against the one percent AGD until such time as rehabilitation standards are met.

Native Plant Harvesting: (HCA-39) Native plant harvesting would not be allowed within the HCA. The term plant harvesting does not include plant salvage from ground disturbing activities, seed or propagule collection, eradicating non-native weeds or research. Outside of the HCA, plant harvesting would be regulated in accordance with the California Desert Native Plant Protection Act, the Native Plant Protection Act and CESA.

Recreation: (HCA-40) No vehicle speed events would be allowed in the portion of the HCA that lies within the DWMAs and the MGS Conservation Area.

(HCA-41) BLM would continue to implement the existing biological opinion on dual sport events, subject to the following guidelines:

- Dual sport events would be allowed seasonally *in DWMAs* (including the Rand Mountains). Dual sport events would be allowed from **1 November to 1 March** while **most** tortoises are hibernating. Existing education materials would be supplemented to indicate that very young tortoises may be encountered during the fall and winter, at the time of the event, and should be avoided.

- Dual Sport events in those portions of the *MGS Conservation Area outside of the DWMA* would be allowed in the period of **September through February** only. The prescriptions given in the biological opinion for tortoises would apply.

- Subject to the requirements of the biological opinion, dual sport events *outside of DWMAs and the MGS Conservation Area* would be allowed **year-round.** Within the Carbonate Endemic Plants and Pisgah Crater Research Natural Area ACECs, specific stipulations, to be developed at the time of event application, would apply.

- BLM would revise its educational materials provided to dual sports participants to indicate that (1) both adult, and particularly hatchling, tortoises may be active at Thanksgiving and (2) riders should watch for and avoid such animals.

- Dual sport events must be evaluated on a case-by-case basis, including full NEPA compliance.

- Dual sport events must use designated open routes (only).

(HCA-42) Minimum impact recreation (e.g., hiking, equestrian uses, birdwatching, photography, etc.) would be allowed within the HCA.

Wildlife Water Sources: (HCA-43) Existing springs, seeps, and artificial water sources (guzzlers, drinkers, tanks) would remain in place. Water sources at natural springs and seeps shall not be diverted and native riparian vegetation shall not be removed to create artificial water sources for wildlife. The BLM, USFWS, CDFG and non-profit organizations, such as Quail Unlimited, would be allowed access to the waters for maintenance and for removal of invasive vegetation, subject to existing restrictions (e.g. vehicle travel in wilderness areas). Retention of livestock water sources would be at the discretion of the grazing allottee.

2.2.4.2 Desert Tortoise

2.2.4.2.1 Take-Avoidance Measures

Commercial Activities: (DT-1) Commercial activities, such as commercial filming that result in ground disturbance or adverse effects are allowed in the DWMAs but only if take avoidance measures applicable to temporary construction impacts are applied.

(DT-2) On public lands, BLM s current management is considered appropriate for future filming activities. In addition the following measures would apply:

- The BLM would develop a brochure, to be provided to the proponent (likely location manager), showing DWMAs and higher density areas within DWMAs that should be avoided insofar as possible

- Where filming activities may occur equally well on alternative sites, the BLM would first direct proponents to lands outside DWMAs. Within DWMAs, BLM would direct proponents to lower density areas

- Preplanning, including measures given above, would rely on BLM biologist s expertise to help the location manager choose sites where the fewest and least significant impacts would occur

- If biological monitoring shows that filming is adversely affecting tortoises inside DWMAs, the Implementation Team will consider remedial actions, which if deemed necessary could include limitations or prohibitions on filming activities within DWMAs.

(DT-3) On private lands, the CEQA Lead Agency would continue to ensure that filming activities do no constitute a significant impact to species covered by the Plan. The following measures would apply:

- Cities and counties would report take of tortoises annually, including loss or damage to habitat, to the Implementation Team for reporting purposes and adaptive management.

- Special filming activities that require pyrotechnics, cross-country travel, and habitat loss would be referred by the lead agency to the Implementation Team for review and recommendation prior to permit issuance.

Domestic and Feral Dogs: (DT-4) Dogs off leash that are accompanied by and under the control of their owners would be allowed except where prohibited (e.g. construction sites in DWMAs).

(DT-5) Within two years of Plan adoption, the Implementation Team, BLM, county animal control, and other applicable entities would develop a Feral Dog Management Plan (FDMP). The FDMP would, among other things, determine control measures and identify an implementation schedule. If feral dogs continue to be a significant threat to tortoises and other covered species, the earliest phase(s) of the FDMP would be implemented within three years of Plan adoption.

Highway Construction and Maintenance: (DT-6) Proponents wishing to construct new roads or railroads are encouraged to locate them outside of DWMAs. Proponents should implement designs and maintenance procedures that are consistent with the existing terms and conditions identified in various biological opinions for roads; locations of such roads should consider reserve design relative to the DWMAs and other factors.

(DT-7) Maintenance operators must be aware of tortoises and avoid them. Seasonal restrictions may be appropriate (November 1 through February 1 may be the best time for these activities). Any such activities should consider tortoise densities in the area and adjacent

management areas. If the Implementation Team judges that these or other measures are not avoiding take of tortoises, a biological monitor may be necessary.

(DT-8) As far as possible, roadbeds should not be lowered and berms should not exceed 12 inches or a slope of 30 degrees. Helendale Road, Fossil Bed Road, Camp Rock Road, and Copper City Road were identified as particular problems. Consider alternatives to grading, such as chain drag. Berms are likely barriers to vehicle straying into adjacent habitats, and should not necessarily be identified for complete removal. These specifications would be adjusted accordingly if it is determined that tortoises (particularly subadults) are still being trapped within roads having such dimensions.

(DT-9) Invasive weeds should not be used in landscaping within or adjacent to DWMAs (e.g., non-native species should not be used in re-seeding programs).

Hunting and Shooting: Hunting would be allowed in all areas as regulated by current legislation.

(DT-10) The shooting or discharge of firearms would generally be permitted on public lands except in specified areas (e.g. off highway vehicle open areas), as long as State and local laws permit such activity. On public lands within DWMAs, the only firearms discharges allowed would be during hunting season in pursuit of game, and target practice using retrievable targets only (such as paper targets). These activities are regulated in order to minimize conflicts and resource impacts.

Utility Construction and Maintenance: The CDCA Plan s network of designated utility corridors and use restrictions is consistent with Alternative A s tortoise conservation strategy.

(DT-11) The Implementation Team would review new linear utility projects within the HCA at the time they are proposed. The Implementation Team would consider the following guidelines during its review:

- To the degree possible, new utility right-of-ways in BLM-designated, active and contingent corridors would be situated as closely together as practical given engineering specifications, human safety, and other limiting factors.

- If an option is available, Corridor W will be used rather than Corridor H in the Ord-Rodman DWMA.

- If at all possible, future utilities will be located in an alternative corridor rather than Corridor Q, or as given above, be situated to minimize the width of impact between existing and new utilities.

- Within existing corridors, areas that are already disturbed will be used rather than undisturbed areas within the two- to three-mile wide corridor.

- Pipelines within DWMAs will be revegetated after installation. Construction rights-of-way will be narrowed, to the degree possible, in all management areas. In DWMAs, the effects of ground disturbance caused by projects will be restored in a manner that: (a) stabilizes soil surfaces to control erosion by wind and water; (b) minimizes or eliminates future vehicle use in areas to be revegetated; (c) minimizes or eliminates future vehicle use of adjacent, undisturbed areas; (d) curtails the spread of exotic weeds; and (e) provides habitat for the target species (see success criteria discussion given in Section 3.4.2). Revegetation is customarily applied to those portions of a given right-of-way that are not within the designated access road. Revegetation is typically applied to those portions of a newly-disturbed right-of-way that are adjacent to the official access road. Access for maintenance and normal operating procedures is generally provided along the access road, not in adjacent areas where revegetation would be appropriate.

- A standardized revegetation plan would be developed by the Implementation Team or its appointee and applied equitably throughout DWMAs. The revegetation plan will clearly state goals, methods based on the best available scientific information and success criteria that are realistic for desert restoration. A technical advisory team of regulatory personnel, restoration experts, knowledgeable utilities personnel, and others will be assembled to devise and write guidelines for the standardized revegetation plan.

- Maintenance of existing utilities would be allowed, and impacts to tortoises and their habitats must be avoided. Maintenance crews must remain on existing access roads except for the point location of maintenance-related disturbance. Take of tortoises during maintenance activities is not authorized under this Plan. Such take must be authorized on a case-by-case basis.

- In DWMAs, non-emergency maintenance of utility right-of-ways resulting in ground disturbance should occur between November 1 and March 1. Juvenile tortoises may be active during this time and must be avoided. If maintenance during this period is infeasible and is required between March 2 and October 31 in DWMAs, a biological monitor must be present, or the proponent must provide an assessment that clearly shows that tortoises would not be affected.

- The Implementation Team would facilitate issuance of applicable salvage permits, of as long duration as possible, to participating utility companies to enable them to remove raven nests from transmission lines and other facilities.

2.2.4.2.2 Survey and Disposition Protocols

Background: Before commencing new ground disturbing activities, tortoise surveys must be conducted. Two survey techniques are utilized: (a) *presence-absence surveys* to USFWS protocol (1992) and (b) *clearance surveys*, where tortoises are removed from a site immediately prior to construction.

In the past, project proponents were required to conduct both surveys in all areas. The long-term intent of Alternative A is to reform the survey requirement based on existing and new survey data so that surveys would not need to be conducted in areas outside of DWMAs where the available data indicate that tortoises have been extirpated or would not normally occur (e.g. urbanizing areas, habitats above 5,000 feet elevation, playas, etc.).

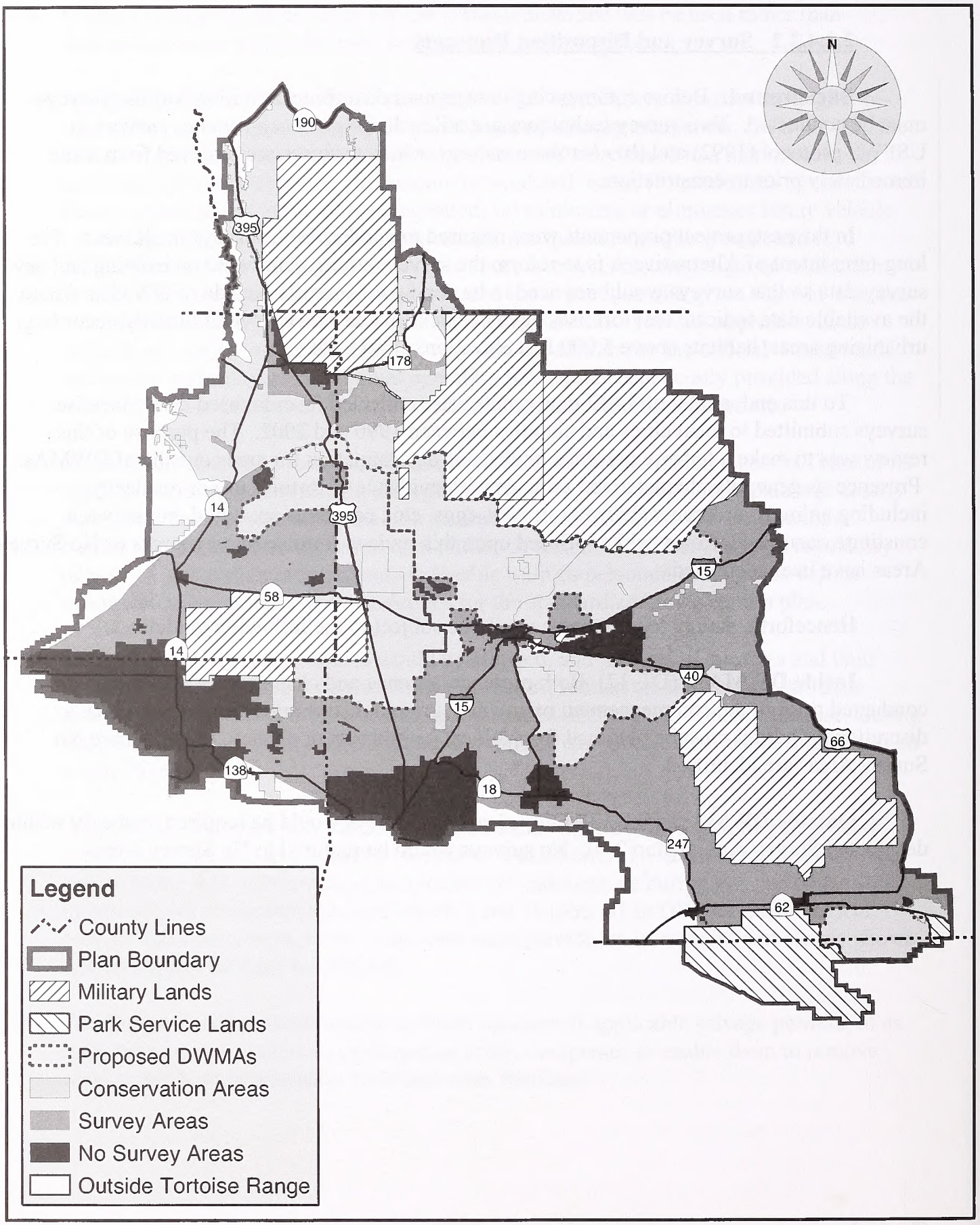
To this end, a total of 1,412 data points were collected from focused desert tortoise surveys submitted to local cities and counties between 1990 and 2002. The purpose of this review was to make a tortoise presence or absence determination for areas outside of DWMAs. Presence is generally characterized as lands with evidence of tortoise use or residency, including animals, droppings, burrows, tracks, eggs, etc.; carcasses are noted, but may not constitute occupied tortoise habitat. Based upon this review, tortoise Survey Areas or No Survey Areas have been identified.

Henceforth, survey requirements would be subject to the following guidelines.

Inside DWMAs: (DT-12) Both presence-absence and clearance surveys must be conducted prior to the commencement of any new ground disturbing activities for which a discretionary permit must be obtained from a local jurisdiction or agency, except where No Survey Areas are identified.

Outside DWMAs: (DT-13) Only clearance surveys would be required, and only within designated Survey Areas (Map 2-9). No surveys would be required in No Survey Areas.

Tortoise "Survey" and "No Survey" Zones



West Mojave Plan FEIR/S
Map 2-9

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

- Survey Areas. Survey Areas comprise lands where there is some likelihood that tortoises occur. Within Survey Areas, tortoise clearance surveys would be conducted prior to any new ground disturbance for which a discretionary permit was required. Surveys should follow USFWS protocol (1992) as modified herein. The Implementation Team would prepare a standard data sheet to record how many, if any, tortoises are moved from harms way. The Implementation Team should use these data to determine the actual harassment and mortality take of tortoises authorized by the Plan. The Implementation Team would also reassess these data annually, and modify Survey and No Survey Areas accordingly.

  It would still be appropriate to perform presence-absence surveys for projects in Survey Areas located outside DWMAs where there may be several alternative sites or alignments. This would make data available to choose the site that best meets the project proponent s needs while minimizing impacts to tortoises and habitat.

- No Survey Areas. Neither presence-absence nor clearance surveys would be required. A hotline number would be provided by the local jurisdiction so that the Implementation Team can be contacted if a tortoise is found on the site at the time of ground disturbance.

Other Species: (DT-13a) The biologist conducting the tortoise clearance survey will report any covered species seen to the local jurisdiction so that potential take can be tracked by the Implementing Authority.

Best Management Practices (BMP) for Construction Projects: (DT-14) Ground disturbing construction projects authorized by the West Mojave Plan must be conducted in accordance with the Best Managem ent Practices (see Appendix I). BMPs would be implemented in DWMAs and in Survey Areas outside DWMAs when:

- Tortoise sign is found during the clearance survey; or

- The Authorized Biologist determines that there is a reasonable likelihood that a tortoise may enter into the construction site, use area, or other zone of impact.

Projects subject to BMPs may include, but are not limited to, the following: construction of pipelines, utility lines, fiber optic cables, wind energy development, solar energy development, flood control facilities, new mine sites, expansion of existing mine sites into tortoise habitat, cross country mineral exploration, discretionary commercial, industrial, or residential development (excluding single-family residences outside of DWMAs), new road construction, widening or realignment of existing roads, and mineral exploration which involves vegetation disturbance. BMPs normally would not apply to authorized recreation events (e.g., Dual Sport), most maintenance activities along existing linear corridors (unless such activities result in additional loss or degradation of tortoise habitat), and filming activities on lands administered by the BLM (which are covered by a separate set of take avoidance measures).

The Implementation Team should determine the best application of the BMPs, consider them as guidelines, and modify them as necessary. In DWMAs, application of the BMPs should be determined by the Implementation Team on a case-by-case basis, and rely on the results of the newly completed presence-absence survey. In Survey Areas outside DWMAs, a standardized set of BMPs should be developed and distributed by local jurisdictions over the counter when the discretionary permit is issued.

Linear construction projects (e.g., pipelines, transmission lines, fiber optic cables, etc.) may disturb ground both inside and outside DWMAs. The BMPs that are applicable to any particular portion of such a project are determined by the location of the disturbed ground. Thus, DWMA BMPs apply to the portion of the project that lies within the DWMA, but not elsewhere.

The BMPs identify tasks to be performed by authorized biologists and environmental monitors. The recommended experience level for each of these and a summary of many of their responsibilities is presented in Table 2-13. The Implementation Team or pertinent regulatory agency must approve all environmental contractors prior to the performance of the activities listed below.

Table 2-13
General Experience Level and Responsibilities for Authorized Biologists and Environmental Monitors Overseeing Ground-Disturbing Construction Activities in DWMAs in the West Mojave Plan Area

TITLE	GENERAL EXPERIENCE LEVEL	GENERAL RESPONSIBILITIES
Authorized Biologist	1. Approved by the pertinent regulatory agencies. 2. Have BA, BS, MA, MS, etc. in biological sciences and/or previously handled tortoises during authorized projects; or 3. Sixty (60) days in the field working under the supervision of an Authorized Biologist, assisting in locating and processing (without necessarily handling) desert tortoises in occupied habitat. 4. The Authorized Biologist would be considered qualified for that position if previously approved by the USFWS to monitor construction in tortoise habitat under Section 7.	1. Authorized to perform all BMPs that require tortoise surveying or handling. 2. Have authority to temporarily stop any construction activity likely to harm a tortoise, or which is in violation of pertinent BMPs. 3. Function as the Field Contact Representative (See measures 7, 8, and 39 in Appendix I). 4. Be responsible for quality control and primary author of monitoring reports (with assistance from environmental monitors, as needed).
Environmental Monitor	1. Approved by the pertinent regulatory agencies. 2. Ranges from no experience to less experience or education than cited above for Authorized Biologist	<u>May</u>: 1. Handle tortoises only in emergency situations; 2. Perform clearance surveys only in the presence of an Authorized Biologist; 3. Perform monitoring activities in the absence of an Authorized Biologist, and maintain constant communication should a tortoise need to be handled;

TITLE	GENERAL EXPERIENCE LEVEL	GENERAL RESPONSIBILITIES
		4. Administer a tortoise awareness program if an Authorized Biologist is not available; and, 5. Have authority to temporarily stop any construction activity likely to harm a tortoise, or which is in violation of pertinent BMPs. May Not: 1. Routinely handle tortoises in non-emergency situations; 2. Perform clearance surveys in the absence of an Authorized Biologist; 3. Monitor in high-density tortoise concentration areas where tortoises are more than likely to be moved from harms way; 4. Perform Zone of Influence Surveys, unless in immediate contact with the Authorized Biologist; should remain on the subject property being surveyed.

Handling Guidelines: (DT-15) The following handling guidelines apply as indicated:

- In all areas, (a) injured, recently dead, ill and dying tortoises would be collected and disposed in accordance with the June 2001 disposition protocol (*Salvaging Injured, Recently Dead, Ill, And Dying Wild, Free-roaming Desert Tortoises (Gopherus agassizii)*) developed by Dr. Kristin Berry (Berry Salvage Protocol); and (b) It is suggested that tortoises be handled by authorized biologists as given in the Desert Tortoise Council s (1999) protocol, *Guidelines for Handling Tortoises During Construction Projects.*

- Within DWMAs, Tortoises should be moved from the immediate area of impact to adjacent suitable habitat (or burrow). In general, tortoises should be moved no further than 1,000 feet from the impact area. The potential for these animals to wander back into harm s way should be taken into account, and the distance given above modified by the Authorized Biologist, as necessary. Temporary or permanent fences may be needed to prevent tortoise immigration into the impact area.

- Within designated Tortoise Survey Areas, (a) If only a small portion of a given site is to be developed then tortoises should be moved to portions of the site that are not to be developed; (b) Tortoises may be moved onto BLM lands if such lands are within (1/2) mile of the impact area; (c) If options (a) and (b) are not available, then tortoises can be moved into the edge of a DWMA that occur within one mile of the site; and (d) If options (a), (b) and (c) are not available then, with input from the Implementation Team, tortoises should be made available for research, educational purposes, captive breeding, zoo placement, adoption through recognized organizations (e.g. California Turtle and

Tortoise Club), moved to areas within SRAs referred to above or, if clinically ill, dealt with in a manner consistent with the Berry Salvage Protocol.

- If the Implementation Team determines that the above scenarios are not accommodating all wild tortoises removed from impact zones where there is permanent loss of habitat, then it should consider establishing translocation sites into which animals can be placed. These areas may accommodate displaced tortoises from the western and eastern portions of the planning area, respectively.

- Within No Survey Areas, (a) Develop telephone tech support for the general public to deal with free-roaming tortoises; and (b) with input from the Implementation Team, free roaming tortoises should be made available for research, education, captive breeding, zoo placement, adoption through recognized organizations (e.g. California Turtle and Tortoise Club) or, if clinically ill, treated in a manner consistent with the Berry Salvage Protocol.

2.2.4.2.3 Proactive Tortoise Management Programs

Disease: (DT-16) The disease management program s focus would include but not be limited to the following: (1) Infectious diseases including URTD (*Mycoplasma agassizii, Mycoplasma cheloniae*, etc.), herpesvirus, shell diseases (cutaneous dyskeratosis, necrosing, fungal disease, etc) and others; and (2) Presumed noninfectious diseases including heavy metal and other elemental toxicants.

Issues relative to disease would be considered at the level of the interagency desert tortoise Management Oversight Group (MOG). Disease research is encouraged, and coordination between the Implementation Team and the appropriate MOG contact should be maintained. Any breakthrough relative to disease management should be incorporated into the West Mojave Plan through adaptive management provisions.

(DT-17) A potential disease management program that could be implemented by the participating agencies is presented in Table 2-14. Primary reliance, however, would rest upon measures implemented by the MOG. Implementation of the program suggested by Table 2-14 would occur only after all other tortoise management programs established by this Plan have been funded and implemented.

Table 2-14
Suggested Tortoise Disease Management Strategy

Management	**Vector Control**	-- Install boundary fencing at urban/desert interface and along critical habitat boundary -- Develop a biologically based quarantine management protocol -- Define criteria that trigger quarantine management -- Implement quarantine in those areas where this trigger has already been met -- Delineate potential boundaries for quarantine fencing (could be effectively combined with dog management) -- Implement head starting or appropriate re-introduction protocols in critical habitat areas with few to none remaining diseased tortoises to protect reintroduced tortoises from contact with infected tortoises.
	Education	-- Address relocation issues, user issues (stress importance of curtailing incompatible human activities) and captive issues (including deliberate and accidental releases)
	Emergency Trust Fund	Establish a trust fund, in the amount of at least $100,000, to be spent only in an emergency situation where immediate actions were required to deal with a disease epidemic. Would be available to implement emergency measures identified through research and endorsed by USFWS, CDFG, MOG and the Implementation Team. Funds would not be available for general research.
	Maintain Genetic Diversity	-- Develop an Assurance Colony protocol to ensure that the heterogeneity of the West Mojave Recovery Unit is maintained -- Establish criteria that trigger implementation of the protocol -- Establish captive Assurance Colonies to protect the few remaining animals in critical areas
	Promote Tortoise Health	-- Improve habitat conditions -- Ensure adequate nutrition by improving quality of forage in critical habitat (reduce weed dispersal by reducing motorized vehicle route density; reduce biomass of non-native plants by reducing/eliminating ground disturbance) -- Eliminate sources of excess nitrogen (sludge, biosolids) from critical habitat vicinity -- Eliminate sources of windborne toxicants (sludge, biosolids) from critical habitat vicinity -- Field trials of experimental interventions (water, feed supplementation
Monitoring		-- Monitor dust emissions from mining sites, agricultural fields, road edges, disturbed playas for toxic elements such as: As, Cd, Cr, Hg, Pb, Zn, Cu, Mo, Se, etc -- Monitor tortoise health status -- Necropsy all ill, dying and recently deceased tortoises as per salvage protocols
Research		-- Epidemiological studies of URTD, herpes virus and other diseases. -- Studies to determine phylogeny of the West Mojave Recovery Unit tortoises -- Studies to investigate relationship between toxicants, depression of immune system and disease -- Head-starting/demography studies -- Disease transmission studies -- Develop a scientifically-based ELISA test for herpesvirus

Fencing: Tortoise mortality along highways remains a significant, persisting threat. This threat can be minimized by the construction of fencing adjacent to highways that is designed to preclude access to highways by tortoises.

(DT-18) Unless new information reveals a better order of priority, the following roads, which are all bounded by proposed DWMAs, would be fenced on both sides in the following order: (i) Highway 395 between Kramer Junction and Shadow Mountain Road; (ii) Highway 395 between Kramer Junction and 20 Mule Team Road; and (iii) the remaining portions of Highway 58 between Kramer Junction and Hinkley.

Generally, both sides of the road would have tortoise fencing.

Placement of tortoise fences along paved roadways would be coordinated among the Implementation Team, Caltrans, BLM, county road departments and others to ensure that access is provided to those motorized routes designated by BLM as open that intersect with roads to be fenced. The Implementation Team would ensure that the latest, state-of-the-art gate designs are used at designated portals.

(DT-19) Other potential problem roads, some of which are identified in the tortoise Recovery Plan, include *paved roads* (National Trails Highway between Helendale and Lenwood; Highway 247 between Barstow and Lucerne Valley; Fort Irwin and Irwin roads; Shadow Mountain Road; Red Rock-Randsburg Road; and Garlock Road) and *dirt roads* (Camp Rock Road; Copper City Road; Fossil Bed Road; and unpaved portions of Helendale Road); there may be others. The Implementation Team would monitor tortoise mortality along these and other roads and identify measures such as fencing, culverts, signs, or speed regulators to reduce or avoid unacceptable mortality levels.

(DT-20) Within DWMAs, when roads are fenced to preclude entry by desert tortoises, culverts of appropriate design and spacing to allow desert tortoises to pass under the road would be installed to avoid habitat fragmentation and to allow continued gene transfer from one side of the road to the other.

(DT-21) The Implementation Team, working with Caltrans, BLM, county road departments and others would ensure that fences and culverts are appropriately monitored, and that fence integrity and unobstructed culverts are maintained throughout the life of this Plan.

Immediate fencing is preferable, and would have demonstrable results. The Implementation Team would coordinate with Caltrans and others to fence identified easements as major construction projects occur. If an opportunity exists to fence a road but culverts cannot be installed at the time of fencing, the fencing should proceed because reducing mortality of desert tortoises is a more immediate need than promoting genetic interchange. Culverts would be constructed at the time of widening.

(DT-22) The Implementation Team would initiate a working group with the Silver Lakes Association to determine if fencing or public education is the best means to eliminate impacts on the Fremont-Kramer DWMA created by off highway vehicle use originating in that community. The working group would also strive to minimize impacts by pets and feral dogs originating from that community. Once an approach is agreed upon, the efficacy of the solution should be monitored and adaptive management employed if impacts are not being curtailed. The Implementation Team may require fencing of other areas as deemed necessary to address threats.

(DT-23) DWMA boundaries should be signed or otherwise designated to identify boundaries and facilitate enforcement. Signs are critical to law enforcement, enabling officers to deal with an informed public who knows about designated uses and applicable prohibitions. The Implementation Team would ensure that boundary signs are appropriately worded and spaced to maximize their usefulness. An appropriate number of signs (to be determined) should be strategically placed between the two OHV open areas (Stoddard Valley and Johnson Valley) and the adjacent, Ord-Rodman DWMA. Strategic signing is important to direct motorized vehicle users to proper areas to ride, such as open areas and designated vehicle routes, and to indicate conservation areas, as appropriate. A quick field check should determine if boundary is adequately signed.

(DT-24) Additional law enforcement (ranger patrols) and educational outreach (recreation technicians) would be used in concert with fencing and signs to inform the public of appropriate and inappropriate activities in conservation areas.

(DT-25) A standard fence would be placed along pertinent portions of the western boundary of the Johnson Valley Open Area to prevent OHV use in the Ord-Rodman DWMA to the west and to minimize use in the Cinnamon Hills.

Headstarting: (DT-26) Implement a headstarting program in areas where tortoises have apparently been extirpated or numbers significantly reduced. These could include but are not limited to areas west and south of Fremont Peak (although the Hamburger Hill region northwest of Fremont Peak should be avoided), Fremont Valley, and the Desert Tortoise Research Natural Area. Goals for the headstarting program follow:

- Headstarting would be less experimental and more applicable.
- The short-term goal for headstarting is to minimize predation on tortoise nests and introduce new tortoises onto landscapes that can support them.
- The long-term goal for headstarting is to reintroduce tortoises into DWMAs where they have apparently been extirpated to attain the Recovery Plan goal of a minimum density of 10 adult female tortoises per square mile.

- In unprotected landscapes, it is better to use the short-term program for immediate introduction of a relatively large number of hatchling tortoises into the wild. The short-term method is preferred to meet the stated goals.

- The Implementation Team would ensure that predation by ravens and other predators does not compromise the integrity, function, and success of the headstarting program funded and implemented by this HCP.

- Longitudinal monitoring of tortoises released into the wild through headstarting technologies should persist a sufficient amount of time (suggest at least 15 years) to see if released tortoises are reproducing and adding viable offspring into the study area.

The initial headstarting site would be located immediately adjacent to the BLM s Fremont Peak permanent study plot, where tortoise declines have been documented. This site is particularly well suited because (1) there are data that document tortoise densities and declines in the immediate area; (2) sheep grazing was eliminated from the area in 1991, and no other prevalent human impacts are known at this time; and (3) the site is sufficiently far from Highway 395 to minimize the impact of that road on young, dispersing tortoises, and Highway 395 should be fenced by the time the animals are attaining sufficient sizes to move that far.

Landfills: (DT-27) With the exception of the Barstow Landfill expansion, the planning of which has already been initiated, counties and cities would ensure that no new landfills are constructed inside DWMAs or within five miles of them. The Ord-Rodman DWMA boundary does not include lands within the Barstow Landfill expansion area.

Law Enforcement: (DT-28) A minimum of eight (8) Law Enforcement officers and eight (8) maintenance workers would be assigned to the DWMAs. Of these, BLM would provide two (2) law enforcement Rangers and two (2) maintenance workers; the remainder would be provided by the Implementing Authority.

- Officers should be dedicated full time to natural resource enforcement work within the DWMAs
- Law enforcement may be provided by BLM Rangers or by other officials with law enforcement authority
- Maintenance workers should be dedicated full time to the implementation of this Plan.
- Officers and maintenance workers would be based in the communities closest to the DWMAs in order to reduce travel time and facilitate relationships within those communities.
- Avoid diverting rangers from other duties; new personnel are recommended.
- Law Enforcement officers should work closely with the Implementation Team to facilitate Plan implementation, enforcement, and adaptive management

(DT-29) The following guidelines are suggested as a guide to law enforcement activities in DWMAs. Insofar as possible, law enforcement officers and maintenance workers would prioritize their natural resource patrol activities using the following guidelines. Increased presence in following regions (in decreasing order of priority) is currently preferable:

- Higher density tortoise areas that coincide with higher density human use areas (higher priority), which would result in more enforcement where illegal activities (poaching, vandalism, and pet release) are likely to affect relatively more tortoises (west of Silver Lakes to Kramer Hills, northeastern Iron Mountains, north of Hinkley, and Coyote Corner south of Fort Irwin)
- In DWMAs adjacent to Johnson Valley, Stoddard Valley, and El Mirage BLM open areas, which would provide for increased education of open area users, minimized cross-country travel in DWMAs, and better fence and sign maintenance.
- Higher density tortoise areas that coincide with lower density human use areas
- Higher density human use areas in lower density tortoise areas, which would provide relatively more benefit to habitats than to tortoises, due to depressed population levels (Rand Mountains and Fremont Valley)
- Elsewhere within DWMAs not meeting the variables given above (lower priority)

These guidelines would be modified as needed to address changing patterns in human use and tortoise occurrence, but would make law enforcement more efficacious for the first few years, when it would most likely be needed to educate the public on new management prescriptions.

On private lands, land use enforcement would be by the land use agencies, which work on complaint basis. BLM law enforcement rangers would refer problems to these agencies if seen in the field. Code enforcement agencies (rather than law enforcement) would deal with, for example, illegal grading, and illegal dumping.

Ravens: The following raven management guidelines should be considered in developing a raven control program in the West Mojave. Where headstarting is implemented, ensure that predation by ravens and other predators does not compromise the integrity, function, and success of the program.

The following *habitat alteration* measures should be implemented:

(DT-30) Reduce the population density of ravens and number of birds that may take tortoises by reducing the availability to ravens of solid wastes at sanitary landfills. Reduce raven access to organic wastes at landfills: (i) ensure effective cover of waste multiple times each day (either < six (6) inches cover or complete cover of garbage with tarps temporarily), (ii) erect coyote-proof fencing, (iii) render raven-proof all sources of standing water at the landfill, and (iv) keep truck cleaning areas and temporary storage facilities clean and free from standing water and organic wastes (e.g., food material,

biosolids, mixed solid waste, and other materials that may be consumed by common ravens and not including green material as defined in Section 17852 by the California Integrated Waste Management Board).

(DT-31) Reduce the availability to ravens of organic wastes outside of landfills. Take the following steps: (i) Encourage the use of self-closing trash bins at transfer stations and roadside rest stops, and behind restaurants, gas stations, and grocery stores; use raven-proof garbage drums at houses and other facilities; and avoid use of plastic bags for street-side pick up in residential areas; (ii) Encourage livestock operators to reduce availability of cattle feed, carcasses, afterbirths, and insects at feedlots and dairy farms; (iii) Use public education and other means to reduce the number of citizens who purposely feed ravens or who inadvertently do so by leaving pet food out where ravens can easily access it; and (iv) clean up illegal dump sites that contain organic wastes. These educational efforts should include, but not be limited to, business and agriculture.

(DT-32) Reduce the availability of carcasses of road-killed animals along highways in tortoise habitat. As some ravens derive most of their food from road kills, erect barrier fences (1/2 to 1/4 inch mesh hardware cloth; Boarman and Sazaki 1996) along roads and highways specified in the fencing table to prevent animals from getting killed on roads. Recommendations may be modified as more information and evaluation becomes available.

(DT-33) Reduce the population density of ravens and number of birds that may take tortoises by reducing the availability of water to ravens while being mindful of the needs of other species.

(DT-34) Reduce the impact ravens have on tortoise populations at specific locations by removing raven nests. Remove raven nests (i) in specific areas where raven predation is high and tortoise populations are targeted for special management, and (ii) do so during the egg-laying phase of the raven s breeding cycle. Any nestlings found should be euthanized using standard humane measures.

(DT-35) Avoid constructing new nesting structures and reduce the number of existing nesting structures in areas where natural or anthropogenic substrates are lacking. Reduce availability of nesting sites by observing the following. (i) Within and adjacent to DWMAs, prevent the construction of new structures (e.g., power towers, telephones, billboards, cell phone towers, open warehouses or shade towers, etc.) where alternative natural nesting substrates (e.g., Joshua trees, cliffs) do not already exist within approximately 2 miles. (ii) If they must be built, design such structures in such a way as to prevent ravens from building nests on them. (ii) Remove unnecessary towers, abandoned buildings, vehicles, etc., within tortoise management areas that may serve as nesting substrates unless natural structures are in abundance.

(DT-36) The following *lethal actions* against individual ravens should be implemented:

L1: Remove ravens that are known to prey on tortoises. Selectively shoot individual ravens in areas of high tortoise predation. Ravens would be shot by rifle or shotgun if they show a likelihood of preying on tortoises (e.g., tortoise shells showing evidence consistent with raven predation found beneath or within approximately 1 mile a nest or perch). Ravens would be trapped and humanely euthanized where shooting is not possible (e.g., on powerlines or in residential areas) or unsuccessful. Young ravens found in nests of removed adults would be euthanized humanely if they can be captured safely. Poisoning with DRC-1339 or other appropriate agent may be used against targeted ravens in these limited areas if it is shown by results of the research proposals discussed below to be safe for other animals. Poisoned carcasses would be removed if they can be located.

L2: Facilitate recovery of critically threatened tortoise populations by removing ravens from specific areas where tortoise mortality from several sources is high, raven predation is known to occur, and the tortoise population has a chance of benefiting from raven removal. Remove all ravens foraging within specific areas (e.g., Desert Tortoise Research Natural Area, DWMAs, pilot headstarting sites, etc.) of historically high tortoise mortality and raven predation, particularly where demographic analyses indicate that juvenile survivorship has been unusually low. Ravens would be shot by rifle or shotgun if they are found foraging, hunting, roosting, or nesting within 0.5 miles of the specific targeted area. Where shooting is not possible (e.g., on powerlines or in recreation and residential areas), ravens would be poisoned (if shown by the research programs recommended below to be safe) or trapped and humanely euthanized. Young ravens found in nests of removed adults would be euthanized humanely if they can be captured safely.

(DT-37) The following raven *research measures* should be implemented.

R1: Determine behavior and ecology of ravens as they pertain to predation on tortoises. Data would be collected by direct observations, radio tracking, diet analysis, wing tagging, and non-invasive behavioral manipulations.

R2: Conduct regional surveys of the California deserts to locate and map ravens and their nests and communal roosts. Inventories would include private and public lands. Project proponents and other interested parties would contribute funds to a coordinated surveying program that would concentrate both on specific sites and broad regional patterns.

R3: Methods would be developed, tested, and implemented to determine effectiveness of and need for raven removal efforts for enhancing recruitment rates of juvenile desert tortoises into adult age-classes.

R4: Determine efficacy and cost of shooting as a method of eliminating raven predation and increasing tortoise survival. Data have already been collected and partially analyzed.

R5: Determine if eating hard-boiled eggs may adversely impact animals other than ravens laced with the avicide DRC-1339.

R6: An experiment should be conducted concerning methyl anthranilate (a non-toxic, grape-flavored food additive, but it is disliked by several species of birds) to determine if: (i) ravens are repelled by the chemical; (ii) it can be applied efficiently at landfills and other raven concentration sites, and on sources of water used by ravens (e.g., septage ponds, stock tanks, etc.); (iii) its repeated application prevents ravens from using the resource (e.g., garbage, water, etc.), and (iv) if methiocarb (Avery et al. 1993, Conover 1984), carbachol (Avery and Decker 1994, Nicolaus et al. 1989) or other compounds work better than methyl anthranilate.

R7: Determine if: (i) raven dependence on human-provided perches and nest sites aids hunting, nesting, and overall survival; (ii) modifying raven perches, roost sites, and nest sites on a localized basis is an effective way of reducing raven predation on tortoises; and (iii) removal of raven nests early in the breeding cycle would prevent ravens from renesting in that season.

R8: Determine: (i) if live trapping is a cost effective means of catching ravens, (ii) the relative effectiveness of different live trapping techniques, (iii) where ravens can be relocated practically and legally, and (iv) if relocated ravens would return to the capture site or other desert tortoise habitat.

R9: Develop a demographic model of raven populations to predict the effect various management alternatives might have on raven populations.

R10: Determine the extent ravens use commercial and municipal compost piles, then develop and test modifications to composting practices to make them inaccessible to ravens if a problem exists. Develop and test other methods to prevent ravens from accessing food and waste items.

R11: Determine whether availability to ravens of anthropogenic sources of water could be reduced by modifying sewage and septage containment practices in three possible ways: (i) covering the water, (ii) altering the edge of the pond with vertical walls, (iii) placing monofilament line or screening over the entire pond or (iv) adding methyl anthranilate, or other harmless taste aversive chemicals to standing water sources. Emphasis should be placed on the reduction of water availability during the spring, when ravens are nesting, and summer, when water demands for ravens are high but natural sources are low.

Implement the following *adaptive management* actions.

(DT-38) Establish two work groups to oversee management direction, review information, coordinate with other agencies/groups, solicit funding for implementation of specific management measures, and distribute information/data. The work groups would meet annually or as needed to discuss raven management actions. One work group would be an Interagency Task Force to coordinate implementation of the program. This group would identify specific areas where lethal removal would be implemented using the criteria outlined above. The other would be a technical and policy oversight team to evaluate the progress of the Plan, interpretation of data, and recommend changes in the overall program based on scientific data. This group would help to determine what thresholds of predation and recruitment are necessary to trigger implementation of a cessation of lethal actions. There would be data sharing between adjacent bioregional plans and resource management plans. The goals of the work groups would be to (i) increase efficiency, effectiveness, and scientific validity of raven management in the California deserts, and (ii) ensure that future phases are developed and implemented in accordance with results of research and monitoring outlined above.

(DT-39) Monitor both raven status and effectiveness of management actions at reducing predation rates on juvenile tortoises.

Weed Abatement: (DT-40) The Implementation Team would cooperate with known weed abatement specialists and organizations (including the Kern County Weed Management Agency, the Mojave Desert Resource Conservation District, and the California Exotic Pest Plant Council) to fund, coordinate, encourage, implement, and facilitate weed abatement/management programs that contribute to the conservation of plant or animal species covered by the Plan. Goals to guide weed abatement are provided in the BLM action plan *Partners Against Weeds* (BLM 1996).

Other Measures: (DT-41) The Implementation Team would require a study that would sample quail guzzlers in the West Mojave, in all four DWMAs, to determine if there is a tortoise mortality problem. If the tortoise mortality level were considered unacceptable, then a study would be designed to determine the best method of eliminating tortoise entrapment while not impairing the function of the guzzler. The study should also assess use of quail guzzlers by common ravens, feral dogs, coyotes, and foxes.

2.2.4.3 Mohave Ground Squirrel

2.2.4.3.1 Take-Avoidance Measures

Applicable Tortoise Measures: (MGS-1) The following take-avoidance measures discussed above for application within the DWMAs would also be applied within the MGS Conservation Area: Commercial Activities, Hunting and Shooting, and Utility Construction and Maintenance.

General Construction and Maintenance: (MGS-2) Measures identified for DWMAs and Tortoise Survey Areas and No Survey Areas apply where those areas overlap the Mohave Ground Squirrel Conservation Area, including tortoise survey requirements.

2.2.4.3.2 Pre-Construction Surveys

(MGS-3) CDFG would not require Cumulative Human Impact Evaluation Forms (CHIEFs) to be completed, nor would trapping of Mohave ground squirrels be required.

2.2.4.3.3 Proactive MGS Management Programs

Research and Monitoring Program: (MGS-4) A monitoring strategy would be designed and implemented by the Implementing Team, in coordination with the MGS Technical Advisory Group, to ensure that the management program for this species is accomplishing its objectives.

Kern County Study Area: (MGS-5) Trapping studies should be undertaken in the northern portion of the Antelope Valley in Kern County, on the 23 sections of public land located within a region generally bounded by the Tehachapi Mountains to the northwest, an unpaved road accessing Little Oak Creek Canyon to the west, the Los Angeles aqueduct to the southeast, and the Tehachapi - Willow Springs Road to the northeast. Upon the recommendation of the Mohave Ground Squirrel Technical Advisory Group (based on their review of the survey results) and through the adaptive management provisions of the West Mojave Plan, the MGS Conservation Area boundary could be adjusted to include this area, if justified.

Military Coordination Group. (MGS-6) A group should be established to coordinate with, and assist if requested, staff of the China Lake Naval Air Weapons Station, the National Training Center at Fort Irwin, and Edwards Air Force Base in devising and implementing MGS conservation programs on those installations. The Implementation Team should meet annually with representatives of these installations and the Mohave Ground Squirrel Technical Advisory Group to discuss management needs for MGS conservation.

2.2.4.4 Mojave River Bioregion

Incidental take permit coverage could be provided to ten species that are dependent on conservation of riparian habitat in the Mojave River bioregion. These are:

- Southwestern pond turtle
- Brown-crested flycatcher
- Least Bell s vireo
- Southwestern willow flycatcher
- Summer tanager
- Vermilion flycatcher
- Yellow-breasted chat
- Yellow warbler
- Western yellow-billed cuckoo
- Mojave River vole

Groundwater Criterion. (MR-1) Existing wetland and riparian habitat laws and regulations are sufficient to provide conservation of the riparian vegetation. However, the water supply to the river is not assured. Alternative A proposes a criterion for incidental take permit coverage of the riparian species. This would entail the maintenance of groundwater levels in accordance with the Mojave Basin Adjudication (Physical Solution/Stipulated Judgment & Interlocutory) of April 1993.

Incidental take permit coverage would be provided for the ten Mojave River - dependent species if certain groundwater criteria are met. In order to maintain the riparian habitat for the covered species within the Mojave River bioregion, groundwater must be maintained at the levels indicated in Table 2-15, derived from the Mojave Basin Adjudication. However, no reliance for permit coverage is placed specifically on the adjudication itself.

Table 2-15
Mojave River Groundwater Levels

Zone	Well Number	Maximum Depth Below Ground
Victorville/Alto	H1-1	Seven feet
Victorville/Alto	H1-2	Seven feet
Lower Narrows/Transition	H2-1	Ten feet
Harvard/Eastern Baja Riparian Forest Habitat	H3-1	Seven feet
Harvard/Eastern Baja Surface Water Habitat	H3-2	1705 msl (Plus one foot)

Note: Wells are monitored quarterly. Depths are the minimum groundwater levels necessary to support riparian growth, hence must be maintained at all seasons, especially during the warm-weather growing season.

In the event that all groundwater depth criteria are met for four consecutive quarters, incidental take permit coverage would be provided. Subsequent to this, in the event that a criterion is not met for two consecutive quarters, coverage would be revoked.

Maintenance activities of the San Bernardino County Flood Control District in selected areas of the Mojave River have received a non-jeopardy Biological Opinion from USFWS for potential impacts to the least Bell s vireo and southwestern willow flycatcher. This permitted allowance for take, conservation and restoration of riparian habitat in the Mojave River would remain in effect.

Some of these riparian species are found in smaller numbers elsewhere in the West Mojave. At these other locations, current management is adequate for conservation or specific management measures are prescribed for the riparian species.

Small construction projects and invasive species removal: Riparian habitat containing the nine riparian birds in the Mojave River may be altered by habitat enhancing projects, including removal of invasive species such as Russian olive and tamarisk or by construction of trails, including the Mojave Greenway Trail. At sites where the least Bell s vireo and Southwestern willow flycatcher are known to be nesting, invasive weed removal projects will not take place during the nesting period.

Project proponents constructing within occupied habitat of the Mojave River vole will be required to fence the outer limits of construction and trap and remove voles from harm s way prior to commencement of construction. Voles will be placed in the nearest suitable habitat.

2.2.4.5 Bats

The Plan seeks to protect significant roosts of all bat species and requests incidental take permits under the habitat conservation plan for Townsend s big-eared bat and California leaf-nosed bat.

(Bat-1) Protect all significant roosts by installing gates over mine entrances and restricting human access.

- This, the primary conservation strategy for bats, would be dependent on adaptive management, which would apply to newly-discovered significant roosts. If significant roosts were found, either on public or private lands, protection would be provided by placement of barriers to human entry to the roost, while allowing access for bats. This measure applies to all types of significant roosts, including mine openings, buildings, trees, bridges, cliffs and crevices.
- Although Alternative A recognizes the conservation measures proposed for military installations (which have many of the known significant roosts), incidental take permit coverage is not dependent on military protection.

- Conservation for bats is limited to significant roosts and procedures for take avoidance at non-significant sites. All maternity and hibernation roosts containing more than ten Townsend's big-eared bat or California leaf-nosed bats or 25 bats of the other four species are considered significant roosts.

Of the eighteen significant roosts, seven are on military lands, one is on NPS land, one is just outside the planning area on private land and nine are on public land managed by BLM. The West Mojave Plan will address conservation of the nine significant roosts on BLM managed land. These roosts have reported the following species:

- Roost 1. Maternity roost for pallid bat, Townsend s big-eared bat, California myotis, Western pipistrelle.
- Roost 2. Maternity roost for Townsend s big-eared bat. Public water reserve controlled by Los Angeles Department of Water and Power.
- Roost 3. Maternity roost for big brown bat.
- Roost 4. Maternity roost for California leaf-nosed bat.
- Roost 5. Maternity roost for pallid bat.
- Roost 6. Hibernation roost for Townsend s big-eared bat.
- Roost 7. Hibernation roost for Townsend s big-eared bat.
- Roost 8. Hibernation and maternity roost for California myotis, pallid bat and California leaf-nosed bat.
- Roost 9. Unspecified roost for California myotis.

(Bat-2) Within in the Pinto Mountains, the BLM will protect roosts on public land by gating known and new significant roosts. BLM will notify claim holders on BLM lands containing significant roosts.

(Bat-3) Riparian habitat would be protected within five miles of known or newly discovered maternity roosts for Townsend's big-eared bat. Water diversions and woodcutting would be prohibited. Grazing, if present, would be monitored to assure no undue degradation of the riparian habitat. Elimination of significant roosts for any species of bat will be considered as undue degradation of public lands under the West Mojave Plan.

(Bat-4) Desert wash vegetation within three miles of known or newly discovered maternity and hibernation roosts of California leaf-nosed bats would be protected. Motorized

vehicle use of washes in these locations would be assessed on a case-by-case basis to determine if vehicles harm the desert wash vegetation. If substantial damage from vehicle use is determined to be present, alternative access routes would be developed and the wash routes would be closed or limited.

(Bat-5) BLM would continue fencing around (but not over) open abandoned mine features to provide bats access to roosts and to reduce hazards to the public.

(Bat-6) Applicants seeking discretionary permits for projects which would disturb natural caves, cliff faces, mine features, abandoned buildings or bridges would be required, as a condition of those permits, to conduct surveys to determine use of these features by bats.

- An initial survey would determine if any features that might support significant roosts are present. If additional surveys were warranted, a qualified bat biologist would be retained.

- Surveys at locations where significant roosts are likely should be conducted both in winter and in summer to determine if bats utilize a potential roost for hibernation or for maternity colonies. Surveys that indicate a roost is used during one of the seasons should be repeated during the other season to determine if bas use the roost for both functions.

- Colonial bats may move between roosts, or abandon roosts if disturbed. If the disturbance is eliminated, the bats may return. Therefore, a roost with substantial deposits of bat guano is assumed to be a significant roost, even if bats are not present. Substantial deposits would be determ ined by a qualified biologist and verified by CDFG.

(Bat-7) Prior to disturbance or removal of a non-significant roost, a project sponsor would provide for safe eviction of any bats present by a qualified biologist in consultation with CDFG. Safe procedures include:

- Eviction during the appropriate season. No eviction should occur during maternity or hibernation seasons for the species.

- Temporary closure of the roost after the evening exit flight, then entering the roost and capturing any remaining bats, as feasible.

- Repetition of this procedure for at least two nights to insure that all bats have been removed safely.

(Bat-8) A field review of open routes involving OHV interests, CDFG staff, and BLM staff would be conducted of desert wash vegetation within three miles of significant roosts for California leaf-nosed bats, and determinations of substantial damage would be made at that time.

Routes could be closed, limited, or re-routed to avoid desert wash vegetation. This measure would be applied adaptively to foraging areas near newly detected roosts.

2.2.4.6 Other Mammals

2.2.4.6.1 Bighorn Sheep

The conservation plan for bighorn sheep recognizes the accomplishments and planned management of habitat in the Integrated Natural Resource Management Plans for the National Training Center at Fort Irwin, the China Lake Naval Air Weapons Station, and the Twentynine Palms Marine Corps Air Ground Combat Center. The re-introduction of bighorn at China Lake NAWS and Twentynine Palms MCAGCC holds high potential to augment and increase size. Incidental take permits for bighorn sheep are not sought by the local governments under the habitat conservation plan and cannot be issued by the State for this fully protected species.

Few direct threats now exist to western Mojave Desert bighorn. The primary conservation needs are maintenance of water sources, maintenance of open space linkages between mountain ranges, and prevention of barriers to movement. In addition, domestic sheep can transmit disease to bighorn, so sheep grazing must not overlap bighorn range.

The conservation strategy would enact the following measures:

- (Mam-1) Natural water sources in permanent habitat would be protected and diversions at bighorn springs would be prohibited.
- (Mam-2) Helicopter overflights near lambing areas would be minimized, at least seasonally (January 1 to June 30).
- (Mam-3) BLM would manage sheep grazing allotments to comply with the "nine-mile rule", which is the standard for separation of domestic sheep and bighorn.
- (Mam-4) Removal of burros in the Argus Mountains would continue because of damage to springs.
- (Mam-5) Mitigation measures for mining proposals within occupied bighorn habitat in the San Bernardino Mountains and the San Gabriel Mountains would include funds to monitor potentially impacted sheep herds or to provide additional water sources.
- (Mam-6) The responsible agencies would provide methods for crossing new freeways, aqueducts and canals that otherwise would impede movement of bighorn between seasonal and permanent occupied habitat.

- (Mam-7) BLM and the counties would require fencing of proposed heap leach pads if in occupied bighorn habitat or proven linkages.

2.2.4.6.2 Yellow-Eared Pocket Mouse

(Mam-8) The management plans for the Jawbone-Butterbredt and Sand Canyon ACECs would be amended to incorporate protection of the yellow-eared pocket mouse as a goal of each plan. Recommendations for monitoring, adaptive management, and acquisition priorities (see sections 2.2.8 and 2.2.9) would be incorporated into the plans.

(Mam-9) Overlap with the Kelso Valley Monkeyflower Conservation Area in the Kelso Valley would provide protection for the pocket mouse on public lands at those locations. Land acquisition within the Kelso Valley would be directed to areas where multispecies benefits are most effective. Funds used to purchase lands for the Kelso Creek monkeyflower would also benefit the yellow-eared pocket mouse.

(Mam-10) Grazing by cattle, which degrades the habitat to some extent, would be monitored to prevent excessive loss of topsoil and depletion of shrubs, which are utilized by the yellow-eared pocket mouse for food. Compliance with the BLM regional rangeland health standards is the standard for conservation of yellow-eared pocket mouse habitat on public lands.

(Mam-11) Incidental take for ground-disturbing projects on private lands within the range would be limited to 100 acres until such time as acquisition proceeds, to insure that take does not exceed conservation.

2.2.4.7 Raptors

Raptors addressed by the Plan include burrowing owl, ferruginous hawk, golden eagle, long-eared owl, and prairie falcon. The primary threat to birds of prey within the western Mojave Desert is disturbance at nest sites. An additional threat to the larger species is electrocution from electrical distribution lines. The raptor conservation strategy is designed to address these two threats. Proactive measures to protect regions with concentrations of nest sites include designation of lands as ACECs or Key Raptor Areas and continued acquisition of private lands within designated wilderness.

All raptors are protected by state law under Section 3503.5 of the Fish and Game Code, which makes it unlawful to take, possess or destroy any bird of prey or to take, possess or destroy the nest or eggs of birds of prey.

2.2.4.7.1 Generally Applicable Raptor Prescriptions

(Rap-1) All construction of new electric utility lines throughout the planning area must be raptor-safe. A variety of methods are available, including increasing spacing of conductors,

different placement of conductors on crossbars, insulation of certain conducting links, and installation of artificial perches or perch guards. Approved raptor-safe designs contained with the industry and scientist joint publication *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (Avian Power Line Interaction Committee 1996) would be required for all new electrical distribution lines in the entire planning area. Re-permitting of rights of-way for existing lines would require raptor safe designs at specific sites where electrocutions are known to be a problem or where large raptors are known to concentrate (e.g. Key Raptor Areas, ferruginous hawk wintering areas).

(Rap-2) Development projects, including new mines, must stay 1/4 mile away from occupied golden eagle, long-eared owl and prairie falcon nests unless the line-of-sight from the edge of development is obscured. No construction within the sight line and within 1/4 mile of nest sites would be allowed during the nesting season.

(Rap-3) For new mines near golden eagle and prairie falcon nests, blasting must be avoided within 410 feet of occupied aeries and peak noise levels must not exceed 140 decibels at the aerie. No more than three blasts should take place on a given day nor more than ninety blasts during the nesting season.

(Rap-4) BLM would establish a new Key Raptor Area encompassing the Argus Mountains.

2.2.4.7.2 Burrowing Owl

The burrowing owl conservation strategy consists of: specified survey requirements; education; take minimization measures to prevent owls from being killed in their burrows; land acquisition; a research program; and take limits. Because incidental take cannot be predicted with certainty, the take would be limited until future surveys and monitoring provide better definition of permanent conservation areas.

Survey requirements: (Rap-5) Within the western Mojave Desert, the burrowing owl is found most often in urban settings or at the urban fringe. These locations correspond with incidental take areas for the desert tortoise and most, if not all, other species. For lands where no desert tortoise clearance survey is required, the jurisdictions would provide applicants for discretionary permits with an educational brochure.

(Rap-6) For lands where desert tortoise surveys are required, a concurrent abbreviated survey for the burrowing owl would also be conducted. This survey would consists of an inspection to detect live owls and occupied and potential burrow nest and shelter sites.

(Rap-7) Within the DWMAs, a- survey utilizing the four-visit CDFG protocol would be conducted.

(Rap-8) If the clearance survey or protocol survey within a DWMA shows burrowing owl to be present, the applicant would be required to institute the minimization measures of eviction and burrow closure.

Education: (Rap-9) All jurisdictions would provide applicants for discretionary permits with an informational brochure with an illustration of a burrowing owl, a description of its burrows and how they can be recognized, and a summary of the bird s life history. If at any time prior to grading the applicant becomes aware of burrowing owls on the site, he would be instructed to call a number where a biologist can respond quickly by instituting the minimization measures. This would be a staff member of the Implementing Authority.

Take Minimization: (Rap-10) Burrowing owls can be excluded from a site by eviction, followed by collapse and filling of the burrows. The expectation for evictions is that incidental take (killing of the owls) would be avoided and that the owls would re-establish in a suitable location nearby of their own accord. Procedures are in place where a one-way door is placed in front of all occupied burrows and monitored daily. When the owls are known to have left, the burrows are filled. This procedure would only take place during the non-nesting season. During the nesting season, which extends from approximately February 15 to August 31, the owls must be allowed to complete incubation and rearing of the fledglings. The exact status of nesting owls would be determined on a case-by-case basis. Evictions would take place if burrow searches showed that a single owl was using the burrow, rather than a nesting pair or a female with eggs or young.

In some cases burrowing owls can be relocated into artificial nest sites. This procedure has been employed along farm drainages, flood control channels, and in areas where sufficient open space remains to provide for foraging and a nest site that is not frequently disturbed by human intrusion or by pets. Relocations into artificial nest sites would not be required, but would be encouraged in cases where minimal habitat requirements are met and where the applicant and the CDFG staff agree on sharing of costs and on the relocation site.

Land Acquisition: (Rap-11) Because the burrowing owl is a grassland species, acquisition of habitat would focus on conserving remnant grasslands where they are found in the western Mojave Desert. This raptor is also very well adapted to inhabiting edges of agricultural operations, especially near water, so these limited areas would also be prioritized for acquisition. Acquisition would take place only where other species benefits are evident or where the lands provide essential linkages for the Plan. Three areas within the West Mojave Plan meet these criteria. These are in the Antelope Valley adjoining the California Poppy State Park, along the borders of the Mojave River between Victorville and Barstow, and, to a limited extent, in the Brisbane Valley. The recommended linkage between Liebre Ridge and the Poppy Preserve contains small areas of native grasslands and wildflower fields, and is known to support burrowing owls. This area would be the top priority for acquisition to compensate for loss of burrowing owl habitat.

Research Program: (Rap-12) The Implementation Team would track all new sightings and new nest locations of burrowing owls as they are detected in the future. Burrowing owls conserved within DWMAs or other HCAs would be counted as habitat conserved, with 13 acres counted for each nesting pair. Baseline acreage of habitat conserved would be established within two years of the Plan s adoption and would be used as a reference for the amount of incidental take to be allowed. Detection of occupied habitat in new locations may result in shifting of the acquisition priorities. The first priority for determining presence or absence of burrowing owls would be in the Liebre Ridge-Poppy Preserve linkage, followed by sites along the Mojave River.

Limitations on Take: (Rap-13) For the incidental take permit to remain in effect, conservation of habitat by acquisition must match the take of habitat where nesting owls are evicted or relocated. Mitigation fees and other funds would direct acquisition to sites where burrowing owls are known. Take of habitat would be calculated by parcel size being developed or as 13 acres for each evicted owl (single owls or nesting pairs), whichever is smaller. Successful relocation of owls would not count as take of habitat. Take would be limited as follows:

- The baseline acreage of conserved burrowing owl habitat would be established in the first two years
- Take of occupied habitat, including nest sites, would not exceed the baseline acreage at any time
- Acquisition of occupied habitat would add to the baseline conservation acreage
- Prior to the establishment of the baseline conservation acreage, take would be allowed only within city limits.

2.2.4.7.3 Ferruginous Hawk

(Rap-14) Existing electrical transmission and distribution lines located near regular ferruginous hawk wintering areas would be retrofitted to meet current design standards which prevent electrocution. Retrofitting applies to problem poles identified through monitoring and to voluntary proactive programs of the utility companies.

2.2.4.7.4 Golden Eagle

Incidental take permits would not cover golden eagles under the habitat conservation plan. The CDFG cannot currently issue incidental take permits for golden eagle, which is a fully protected species under the California Fish and Game Code. If new legislation removes the fully protected designation, and the golden eagle is listed under CESA, the golden eagle could be covered by incidental take permits under CESA assuming the requirements described in Section 2.2.3.2 (above) are met. BLM and the local governments will take the following conservation actions:

(Rap-15) Removal of golden eagle nests on transmission lines or in places where direct conflicts exist with resource extraction or recovery, such as mining, would be allowed in accordance with existing federal law. Nest removal or relocation must take place outside the nesting season and be otherwise permitted by the USFWS.

The CDFG cannot currently issue incidental take permits for golden eagle, which is a fully protected species under the California Fish and Game Code. If new legislation removes the fully protected designation, and the golden eagle is listed under CESA, the golden eagle could be covered by incidental take permits under CESA assuming the requirements described in Section 2.2.3.2 (above) are met.

(Rap-16) New mines located where mineral deposits preclude adherence to the restrictions above would initiate a nest relocation effort in cooperation with the wildlife agencies.

(Rap-17) BLM would continue to purchase inholdings within designated Wilderness.

(HCA-3) BLM would establish the Middle Knob ACEC, which would offer additional protection for eagle nests at that location. Provisions of the management plan for the Middle Knob ACEC that provide better conservation for the golden eagle include: 1) a prohibition on the expansion of wind energy projects on public lands, and 2) designation of motorized vehicle routes as open or closed. The plan would also incorporate the monitoring and adaptive provisions of the West Mojave Plan.

2.2.4.7.5 Long-eared Owl

The Plan would establish the Big Rock Creek Conservation Area (see HCA-3). The conservation of this riparian habitat protects suitable nesting and communal roost sites for the long-eared owl. Development buffers as specified in Rap-2 would apply to long-eared owl.

2.2.4.7.6 Prairie Falcon

(Rap-19) Vehicle access would be restricted at selected locations. BLM would enforce seasonal road closures where practical and necessary to protect nesting falcons (e.g. Robber's Roost, El Paso Mountains, Owl Canyon). Prior to limiting vehicle access, a site-specific evaluation would be made to determine if nest locations are within the line-of-sight of vehicles and if seasonal closures are necessary.

(HCA-3) BLM would establish the Middle Knob ACEC, which would offer additional protection for prairie falcon nests at that location (see HCA-3). Provisions of the management plan for the Middle Knob ACEC that would provide better conservation for prairie falcon include: 1) a prohibition on the expansion of wind energy projects on public lands, and 2) designation of vehicle routes as open or closed. The plan would also incorporate the monitoring

and adaptive management provisions of the West Mojave Plan.

(Rap-20) BLM would amend the ACEC management plans for Jawbone-Butterbredt, Rainbow Basin and Great Falls Basin to specify protection of nesting prairie falcons as a goal of the ACECs. The plans would also incorporate the monitoring and adaptive provisions of the West Mojave Plan.

2.2.4.8 Other Birds

2.2.4.8.1 Bendire s Thrasher

A monitoring and census study was performed in 2001 on all Bendire s thrasher habitat within the western Mojave Desert, which was compiled in 1986 and 1987 through extensive surveys by BLM. Of the six identified habitats, Bendire s thrashers were located on only two in 2001. This species has been removed from the list for which incidental take coverage is requested until additional studies are able to demonstrate specific private lands in need of conservation. The conservation strategy for Bendire s thrasher is based on conservation of habitat on public lands where thrashers were seen in 2001 or were abundant in the mid 1980s and conditions appear unchanged.

(B-1) Establish a four-unit conservation area for the Bendire s thrasher. These units would be located in Joshua Tree National Park, northern Lucerne Valley, Coolgardie Mesa, and the southern Kelso Valley. Public lands within this BLM managed conservation area, which total 28,046 acres, would be designated as an ACEC and the multiple use class would be changed to Class L. No change in management is needed within Joshua Tree National Park, where 106,710 acres are designated as habitat. The management of the BLM lands is detailed below.

(B-2) The Kelso Valley Conservation Area (7,678 acres) is within the existing Jawbone-Butterbredt ACEC. BLM would amend the ACEC management plan to include protections and monitoring specifically addressing the Bendire s thrasher (Appendix D). Public lands would be consolidated in the Kelso Valley through land exchanges, if the private landowners are willing. The existing route designation for the Jawbone-Butterbredt ACEC would remain in place.

(B-3) BLM would retain lands within the Town of Apple Valley sphere of influence. This applies only to lands within the North Lucerne Valley portion of the Bendire s Thrasher Conservation Area. Motorized vehicle route designation for northern Lucerne Valley would integrate protection for the Bendire s thrasher.

(B-4) The conservation area on Coolgardie Mesa (13,354 acres) is entirely within the Superior-Cronese DWMA and the Mohave Ground Squirrel Conservation Area. It is contiguous with the Lane Mountain Milkvetch Conservation Area (Map 2-10). Private lands would be purchased on Coolgardie Mesa from willing sellers, and because this region contains several

protected species, these lands would receive a high priority for acquisition. Route designation would reduce the number of open routes to benefit this vehicle-sensitive species.

(B-4a) Harvesting of Joshua trees, yucca and cacti in the conservation areas would be prohibited.

2.2.4.8.2 Gray Vireo

The gray vireo s range within the western Mojave Desert lies along the boundaries of the Angeles and San Bernardino National Forests. It approximates the range of the short-joint beavertail cactus and the San Diego horned lizard. Most of the known occupied habitat is on private land, while a large acreage of potential or suitable habitat is found on public lands.

BLM would establish a new ACEC for protection of the carbonate endemic plants (see HCA-3). This area also serves to protect potential habitat for the gray vireo.

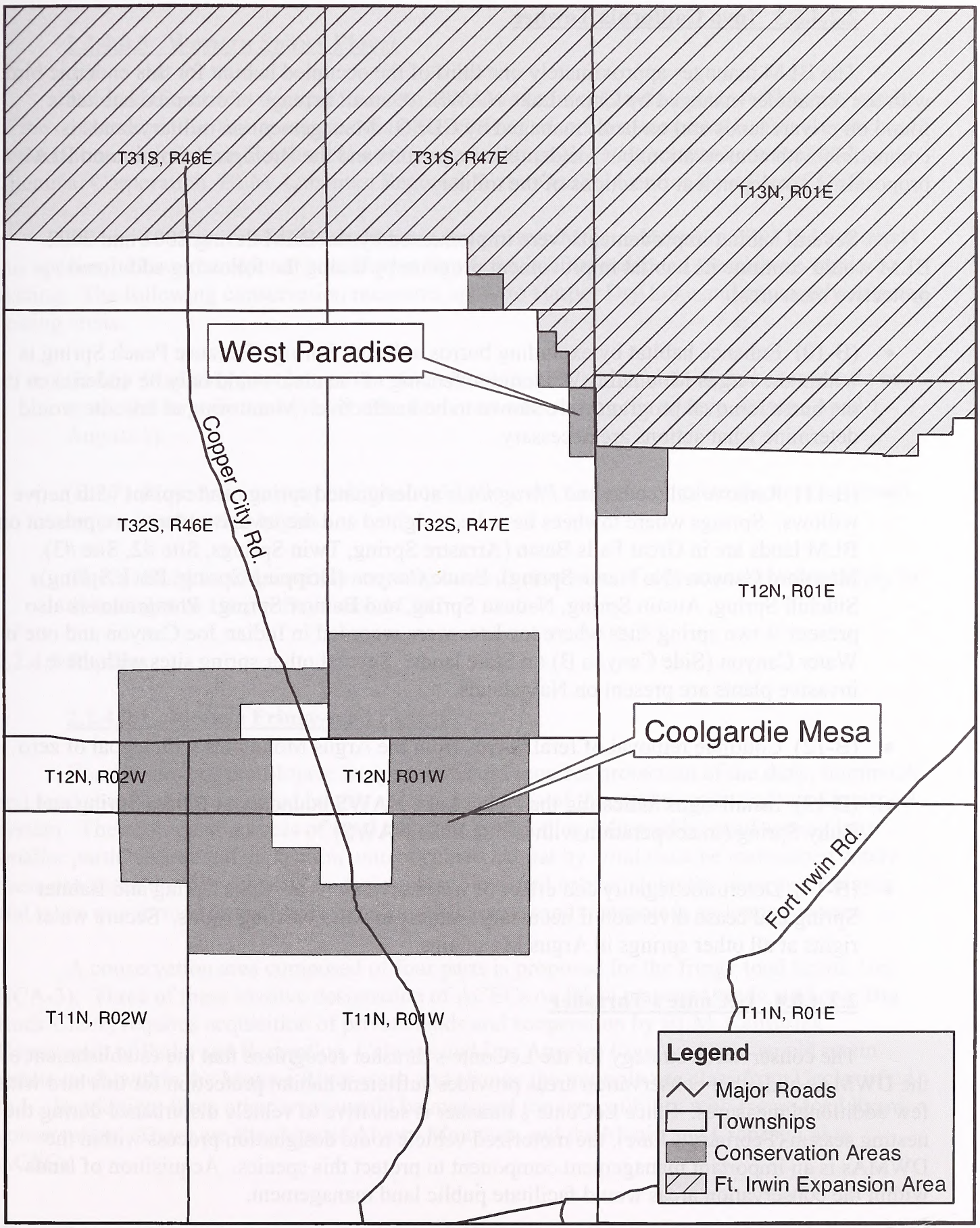
(B-5) BLM would amend the management plan for the Juniper Flats ACEC to incorporate protection of the gray vireo as a goal of the plan. Monitoring and adaptive management provisions of the West Mojave Plan would be added to the management plan for Juniper Flats.

(B-6) Alternative A proposes the establishment of a Big Rock Creek Conservation Area (see HCA-3). Known occupied habitat for the gray vireo is found within this area. Acquisition funds would be directed toward willing sellers of land within the Big Rock Creek Conservation Area. Additional lands within existing Significant Ecological Areas would be conserved by the zoning limitations and development review process established by Los Angeles County. The SEA boundaries may change in the future, providing additional protection to this species.

(B-8) San Bernardino County would review land division and development proposals in the Oak Hills area to insure minimization of impacts to gray vireo habitat.

(B-9) BLM would remove scattered parcels within existing SEAs containing suitable and occupied habitat from the LTA Program disposal zone and change the multiple use class from Unclassified to M. BLM would implement these same measures for parcels outside the SEAs in the San Gabriel Mountains foothills. These lands may be leased or transferred to the jurisdiction of the Los Angeles County Regional Parks Department in the future.

Lane Mountain Milkvetch Conservation Areas



West Mojave Plan FEIR/S
Map 2-10

Scale: 1 : 130,000

0 2.5 5 Km

0 2.5 5 Miles

7/29/04

2.2.4.8.3 Inyo California Towhee

The BLM manages approximately one third of the occupied habitat for this endemic bird, with the remainder managed by China Lake NAWS. A small acreage of occupied habitat is found on private lands and on lands managed by CDFG. Management on military lands is compatible with conservation, but incidental take permits and the Biological Opinion on BLM proposals is not dependent on actions of the military.

Several habitat improvements were implemented by the BLM during 2001 and 2002. BLM would continue its habitat improvement program by taking the following additional protective measures:

- (B-10) Enhance habitat by excluding burros at Peach Spring. Because Peach Spring is within the Argus Mountains Wilderness, fencing of the area would only be undertaken if the burro removal program were shown to be ineffective. Monitoring at this site would determine what actions are necessary.

- (B-11) Remove salt cedar and *Phragmites* at designated springs and replant with native willows. Springs where towhees have been sighted and the invasive plants are present on BLM lands are in Great Falls Basin (Arrastre Spring, Twin Springs, Site #2, Site #3), Mumford Canyon (No Name Spring), Bruce Canyon (Dripping Spring, Rock Spring), Sidehill Spring, Austin Spring, Nadeau Spring, and Bainter Spring. Phragmites is also present at two spring sites where towhees were recorded in Indian Joe Canyon and one in Water Canyon (Side Canyon B) on State lands. Several other spring sites with these invasive plants are present on Navy lands.

- (B-12) Continue removal of feral burros from the Argus Mountains with a goal of zero.

- (B-13) Install signs indicating the China Lake NAWS boundary at Benko Spring and Ruby Spring (in cooperation with China Lake NAWS)

- (B-14) Determine legality and effect of water diversions at Alpha Spring and Bainter Spring and cease diversion if necessary, subject to valid existing rights. Secure water rights at all other springs in Argus Mountains.

2.2.4.8.4 LeConte s Thrasher

The conservation strategy for the LeConte s thrasher recognizes that the establishment of the DWMAs and other conservation areas provides sufficient habitat protection for this bird with few additional measures. Since LeConte s thrasher is sensitive to vehicle disturbance during the nesting season (February - June), the motorized vehicle route designation process within the DWMAs is an important management component to protect this species. Acquisition of lands within the conservation areas would facilitate public land management.

2.2.4.8.5 Western Snowy Plover

Because the current occupied nesting habitat for snowy plover is not well known, much of the conservation for this species would be a result of adaptive management. The known important nesting sites on Searles Lake are protected through an agreement between IMC Chemical Corporation, BLM, Lahontan Regional Water Quality Control Board and CDFG.

Biological surveys of several playas in the western Mojave Desert in 2001 did not detect this species. However, reports from Harper Dry Lake in 2004 indicated the plovers were nesting. The following conservation measures apply to Harper Dry Lake and any newly detected nesting areas.

- (B-16) If nesting populations are discovered, human and vehicle disturbance would be restricted for a distance of 1/8 mile from nest sites during the nesting season (April 1 - August 1).

- (B-17) Projects in nesting habitat should allow the birds to complete the nesting season before construction begins.

- (B-18) BLM would continue working towards provision of a permanent water supply to the marshes at Harper Dry Lake ACEC.

2.2.4.9 Reptiles

2.2.4.9.1 Mojave Fringe-toed Lizard

Conservation of the Mojave fringe-toed lizard requires protection of the dune, hummock, and sand sheet habitat occupied by this species as well as of the sand sources and sand transport system. The ecological process of sand transport by flooding followed by sand sorting into smaller particle sizes and deposition onto occupied habitat by wind must be maintained where these processes are still present. In some cases, blowsand habitat along the margins of playas and lakes was formed in the Pleistocene era, and active sand transport is no longer present.

A conservation area composed of four parts is proposed for the fringe-toed lizard (see HCA-3). Three of these involve designation of ACECs on BLM managed lands, and one, Big Rock Creek, requires acquisition of private lands and cooperation by BLM, California Department of Parks and Recreation, Caltrans and Los Angeles County. BLM would retain public lands within the Mojave River wash and change the multiple use class from Unclassified to L. In addition, three other areas would be managed for compatibility with fringe-toed lizard conservation. These are the slope of Alvord Mountain and the Manix and Cronese Lakes ACECs.

The new proposed conservation area for the Mojave fringe-toed lizard is located at (1) Saddleback Butte State Park, including Big Rock Wash, Piute Butte, Alpine Butte and potential park expansion lands; (2) Dale Lake; (3) Mojave River east of Barstow, which consists of several separate parcels of public land; and (4) the Pisgah area.

Specific conservation actions are listed below:

- (R-1) Prohibit flood control structures that would impede sand transport at Big Rock Creek, Sheep Creek, and the Mojave River.
- (R-2) Aggregate mining in these drainages would be regulated to assure continued passage of sand downstream during flood flows.
- (R-3) Widen the bridge over Big Rock Creek when Highway 138 is improved to allow better sand and water flow and enhance the wildlife corridor between the desert and the San Gabriel Mountains. The existing double channel divided by fill material should be converted into a single long and high span.
- (R-4) Acquire occupied habitat adjacent to the northeast and west edges of Saddleback Butte State Park. BLM would retain scattered parcels within the Big Rock Creek blowsand ecosystem.
- (R-5) Suggest that the boundaries of the Big Rock Creek Significant Ecological Area in Los Angeles County be changed to the consultant s recommendations for the new Antelope Valley Significant Ecological Area.
- (R-6) Acquire specific lands on the slope of Alvord Mountain. Designate routes in this area, part of the Coyote subregion, as closed within the occupied habitat.
- (R-7) Amend the Cronese Basin and Manix ACEC Plans to include protection of the Mojave fringe-toed lizard as a primary goal.
- Designate portions of the Pisgah Crater area as an ACEC (see HCA-3).
- Designate a new conservation area near Dale Lake consisting of public lands within Joshua Tree National Park, the Sheephole Wilderness, and BLM managed lands adjacent to the Wilderness (see HCA-3).
- (R-8) Designate vehicle use on the conserved public lands with occupied habitat as closed.
- (R-9) Restrict the construction of windbreaks upwind of occupied habitat.

2.2.4.9.2 Panamint Alligator Lizard

Conservation of the Panamint alligator lizard parallels that of the Inyo California towhee because of the overlap in range and habitat preferences. No substantiated records of this species exist for the West Mojave Plan area, but it is known from the China Lake NAWS in the canyons of the Argus Mountains, and it very likely to occur within the Great Falls Basin ACEC, the Argus Mountains Wilderness, the Indian Joe Canyon Ecological Reserve (CDFG), and potentially on private lands in Homewood Canyon. Habitat for this species would be conserved and managed by BLM, as specified under the discussion of Inyo California towhee, but it would not be covered by incidental take permits under the habitat conservation plan.

The BLM would continue the removal of feral burros from the Argus Mountains with a goal of zero. In addition, the following new conservation actions adopted for the Inyo California towhee, would benefit the habitat of the Panamint alligator lizard:

- (B-10) Enhance habitat by excluding burros at Peach Spring. Because Peach Spring is within the Argus Mountains Wilderness, fencing of the area would only be undertaken if the burro removal program were shown to be ineffective. Monitoring at this site would determine what actions are necessary.

- (R-10) Amend the Great Falls Basin ACEC management plan to incorporate protection of the Panamint alligator lizard as a goal of the Plan. Include the monitoring and adaptive management provisions of the West Mojave Plan in the ACEC management plan.

2.2.4.9.3 San Diego Horned Lizard

(R-11) BLM would amend the management plans for the Juniper Flats Area of Critical Environmental Concern to incorporate protection of the San Diego horned lizard as a goal of the plan. Monitoring and adaptive management provisions of the West Mojave Plan would be added to the management plan for Juniper Flats.

BLM would establish a new ACEC for protection of the carbonate endemic plants (see HCA-3). This area also serves to protect suitable habitat for the San Diego horned lizard.

Alternative A proposes the establishment of a Big Rock Creek Conservation Area that would protect known occupied habitat for the San Diego horned lizard (see HCA-3). Acquisition funds would be directed toward willing sellers of land within the Big Rock Creek Conservation Area. Additional lands within existing Significant Ecological Areas would be conserved by the zoning limitations and development review process established by Los Angeles County. The SEA boundaries may change in the future, providing additional protection to this species.

(B-9) BLM would remove scattered parcels within existing SEAs containing suitable and occupied habitat from the LTA Program disposal zone and change the multiple use class from Unclassified to M. BLM would implement these same measures for parcels outside the SEAs in the San Gabriel Mountains foothills. These lands may be leased or transferred to the jurisdiction of the Los Angeles County Regional Parks Department in the future.

2.2.4.9.4 Southwestern Pond Turtle

The Southwestern pond turtle is found in only a few locations within the west Mojave, and the Plan s goal for this species is to conserve all existing occupied habitat. The largest populations appear to be those found in the Mojave River, both at Mojave Narrows Regional Park and at Afton Canyon ACEC. Another large population is in the San Andreas Rift Zone at Lake Elizabeth and Lake Hughes in Los Angeles County. The Plan boundary bisects Lake Elizabeth and excludes Lake Hughes.

BLM would amend the management plan for the Afton Canyon ACEC to incorporate protection of the Southwestern pond turtle as a goal of the plan. Monitoring and adaptive management provisions of the West Mojave Plan would be added to the management plan for Afton Canyon. BLM will maintain Proper Functioning Condition of riparian areas in occupied habitat (Objective 3). The riparian restoration and removal of salt cedar will continue at Afton Canyon and Camp Cady.

The local governments would strive to maintain the groundwater levels specified in the Mojave Basin Adjudication in order to maintain the riparian habitat and current location of surface water. Riparian restoration via removal of invasive plants will assist in water conservation along the river.

2.2.4.10 Plants

Wet Season Surveys: (P-1a) In unusually high rainfall years, the Implementing Authority will have the discretion to fund wet season regional surveys for annual plants whose detectability is dependent on rainfall. The survey will search for the covered plant species within suitable habitat throughout their known range.

2.2.4.10.1 Southern Sierra Plants

Seven species of restricted-range plants are found within the wilderness of the southern Sierra Nevada Mountains, primarily the Owens Peak Wilderness. These species are not proposed for coverage by incidental take permits, but would be conserved by the BLM in order to prevent future CESA or FESA listings. The southern Sierra species are:

- Ertter's milkvetch
- Owens Peak lomatium

- Hall's daisy
- Muir's raillardella
- Sweet-smelling monardella
- Dedecker's clover
- Gillman s goldenbush

No current threats to these plants have been identified, although previous work on the Pacific Crest Trail damaged populations of some species. This has led to a program of modified trail maintenance and monitoring of the sites by the Ridgecrest Field Office of the BLM. The sites are remote, requiring a 7 mile one-way hike, and are not affected by cattle grazing, vehicles, or timber sales. Conservation for these plants would consist of continuing the BLM program of education of trail maintenance volunteers.

Because these plants are all on federal lands and would not be covered by incidental take permits, no requirements are imposed for monitoring or adaptive management. However, the database established and maintained by the Implementing Authority would be updated to incorporate new sightings and locations would be reported to the CDFG s Natural Diversity Data Base.

2.2.4.10.2 Carbonate Endemic Plants

Carbonate endemic plants are those whose ranges are restricted to limestone and other surfaces with high carbonate content. Four federally listed species are found on the north slope of the San Bernardino Mountains, and another six species, one of which would be covered by incidental take permits, occur in this area near Lucerne Valley. Most species occur at the higher elevations on Forest Service lands, but range in lesser numbers onto the BLM and private lands north of the San Bernardino National Forest boundary.

(P-1) BLM, in cooperation with the Forest Service, USFWS, mining industry, California Native Plant Society, and other claimholders and landowners held meetings over a four year period to develop a Carbonate Habitat Management Strategy (CHMS). This planning document would be implemented by actions in the West Mojave Plan. The CHMS includes very specific criteria for conservation, land acquisition, and mining. The strategy will receive a separate Biological Opinion applying to both federal agencies. The outlines of this plan and the BLM implementing actions are described below, except for the revegetation standards, which are contained in Appendix S.

Carbonate Plants Management Zone: The four listed species of carbonate endemic plants, as well as the unlisted Shockley s rock cress, would be conserved by applying prescribed management within a designated management zone. This area encompasses approximately 42 sections (25,400 acres) in the CDCA, including 28.5 sections (18,250 acres) of federal land and 80 acres of state land.

The management zone consists of: 1) conserved lands, where protection of the carbonate endemic plants is the mandate, 2) managed lands, which allow uses compatible with the conservation of carbonate endemics, and 3) industrial lands, where mining and other extractive uses are the dominant use.

The conservation goal is protection of the surface from mining and relinquishment of existing claims in two large unfragmented populations contiguous with Forest lands.

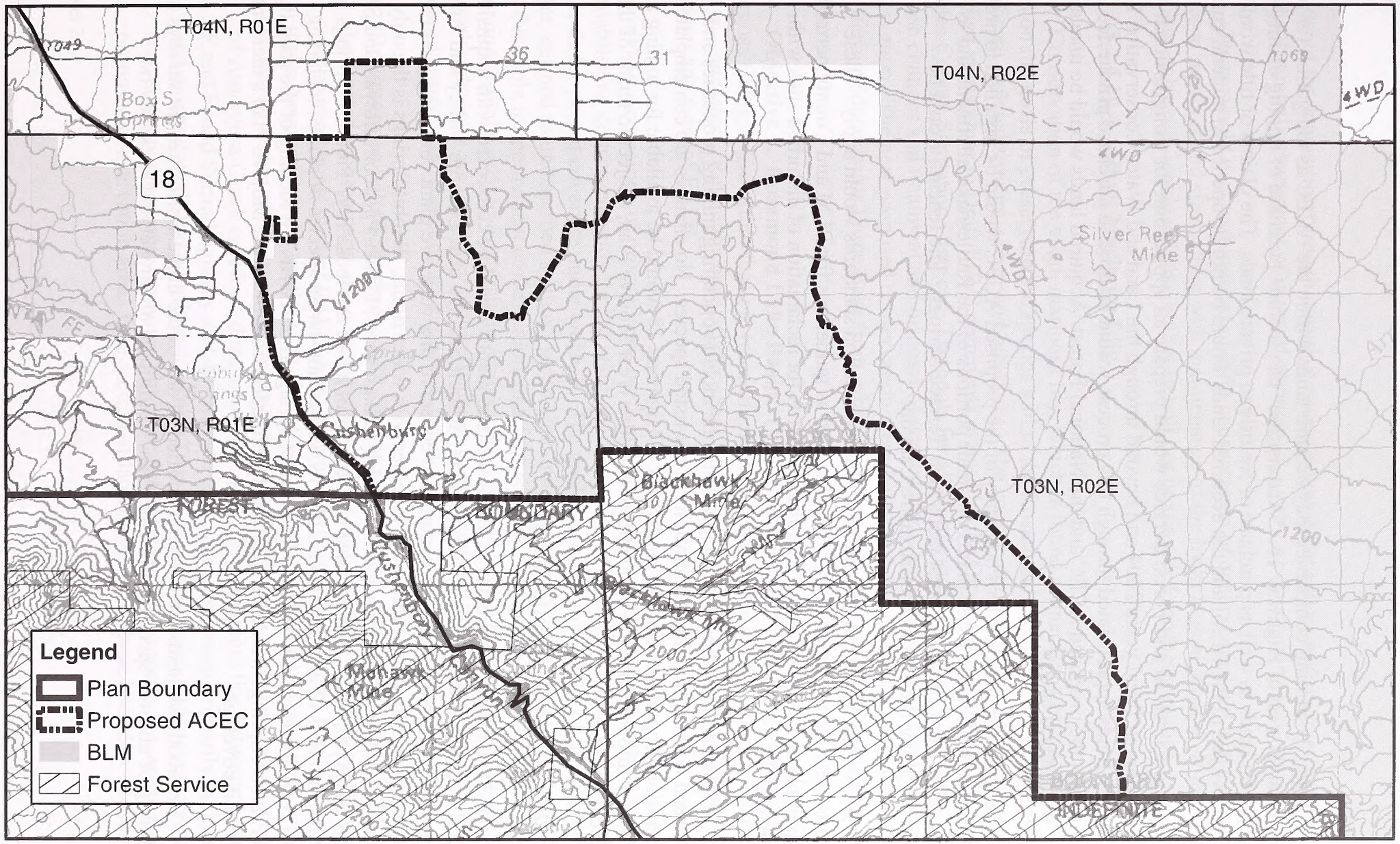
Objective 1: Within the management zone are the two first priority units of the Carbonate Endemic Plants Conservation Area: the area north of Monarch Flats and the area surrounding Round Mountain. These two locations support dense viable populations of all of the listed species. They are separated by the Blackhawk slide, which contains a continuous band of several of the carbonate endemics, although these are present in lower densities. The Blackhawk slide is considered to be an essential link between the major populations, and is the second priority for acquisition or relinquishment of claims. These three areas comprise the conserved lands for the carbonate endemics on BLM lands. Most of the conserved lands are designated critical habitat for these species.

Conserved federal lands (4,393 acres) within the management zone would be designated as the Carbonate Endemic Plants Research Natural Area ACEC (see HCA-3 and Appendix D). Activities within the ACEC would be required to be compatible with protection of the listed carbonate endemic plants. The multiple use class for lands within the ACEC would change from M to L (HCA-9). All existing routes of travel on public land within the proposed ACEC would be designated as open, limited or closed. Access roads would be gated in several places, with access limited to non-motorized users including equestrians and hikers. Vehicle entry would be limited to claimholders and landowners, research activities, permitted recreation events and emergency access, such as fire, rescue, or enforcement access. The ACEC boundaries are shown on Map 2-11.

Objective 2: Three options are presented for acquisition of private land (762 acres) and relinquishment of claims. All three methods may be implemented to achieve the objective.

- Option 1. The BLM would proceed with acquisition of the highest priority private lands. A land exchange could assist with consolidation of lands within each management classification. Public lands bordering the rail spur south of Lucerne Valley would be exchanged for private lands east of Highway 18. The lands along the railway would then be available to mining interests or industrial uses, and the acquired lands east of Highway 18 would be withdrawn from mineral entry.

Carbonate Endemic Plants CDCA Plan Amendment



Scale: 1 : 60,000

0 2 4 Km

0 1 2 3 Miles

West Mojave Plan FEIR/S
Map 2-11

7/29/04

- Option 2. Mining companies may acquire lands within the ACEC as mitigation for use of lands west of Highway 18. "Acquisition" can include purchase of mining claims on public lands as well as purchase of fee title to private lands. The claims or title would be conveyed to the BLM, and the acquired lands would be not be opened to mineral entry.

- Option 3. BLM and Forest Service would prepare an application for Congressional funding in fiscal years 2004 and beyond through the Land and Water Conservation Fund. Any funds appropriated through this process would be used to purchase private fee lands within the proposed ACEC and the National Forest. Acquired lands would be unavailable for mineral entry.

Fencing along the eastern boundary of the proposed ACEC would be installed to prevent cattle from trampling the listed plants on small portions of the Rattlesnake allotment and to prevent cattle from entering Forest lands near Terrace Springs. The fencing would be constructed along the east side of Arrastre Canyon.

Within the management zone, specific reclamation standards would apply. These standards, detailed in Appendix S, would be used as guidelines for BLM and County permitting of mining plans. They would be required standards for reclamation of disturbed sites within the proposed ACEC.

Private lands within the management zone include operating mining properties and undisturbed lands containing populations of the listed species. No changes are contemplated for the operating properties. Certain lands west of Highway 18 would be available for mining and other uses without restriction upon approval of the West Mojave Plan, subject to terms of the biological opinion.

2.2.4.10.3 Alkali Wetland Plants

(P-2) Three target species of alkali wetland plants would be conserved with acquisition of specific springs from private willing sellers. Rabbit Springs near Lucerne Valley and Paradise Springs near Fort Irwin would be acquired to conserve this very rare plant community and the rare plant species found at these sites, together with water rights. Rabbit Springs is the only known site within the planning area for Parish s alkali grass, Parish s popcorn flower, and Salt Springs checkerbloom. This site also has records of alkali mariposa lily. Paradise Springs has extensive numbers of alkali mariposa lily, as well as non-target species of plants, including Cooper rush, giant orchid, black sedge and hot springs fimbristylis. Widening of the road that bisects Rabbit Springs would be specifically excluded from the West Mojave Plan s incidental take permit coverage.

The alkali wetlands have been identified as one of the highest priorities for surveys and monitoring of unlisted species within the Plan. Additional alkali wetland sites may be

considered for acquisition through adaptive management if the survey and monitoring effort detect substantial occurrences of covered species.

There would be a requirement of 90% conservation of occupied habitat of the three target species at newly found sites, along with maintenance of the hydrological regime. If this goal cannot be achieved, incidental take authority will not be provided for these species.

2.2.4.10.4 Alkali Mariposa Lily

Conservation of the alkali mariposa lily, which is found primarily on private land, is based on the goals of preserving the species within the Rosamond Lake Basin and preserving significant isolated springs, seeps, and meadows. The conservation strategy for this species has modified in response to Draft EIR/S comments offered by the City of Lancaster and the Los Angeles County Sanitation Districts. The goals for alkali mariposa lily remain the same. Rapid land use changes and treatment and disposal of wastewater altered the options available for conservation. The new proposed conservation areas have been enlarged, and serve the purpose of buffering Edwards Air Force Base from urban encroachment as well as protecting this rare plant.

Objective 1. Rosamond Lake Basin: (P-3) Retain the flood discharge capability of Amargosa Creek to the extent feasible (recognizing that much of the creek is already channelized through Lancaster). Retain the capacity for sheet flow over the alkali floodplain north of Lancaster and west of EAFB.

(P-4) Acquisition of private lands north and possibly northeast of Lancaster is suggested for establishing conserved lands for the alkali mariposa lily that would meet the federal and state standards for permit coverage under an HCP. The goal is acquisition of 50% of the suitable habitat, defined as undisturbed saltbush scrub containing known occurrences. One area is known to be desirable for permanent conservation, and four additional areas are suggested for evaluation with the goal of establishing additional conserved lands. Both surveys and studies of the local hydrology are necessary within the lands to be evaluated in the interim period. The acquisition targets and methods are suggested below.

- **Designate an Alkali Mariposa Lily Conservation Area.** (See Map 2-12). This would be located in three parts along the boundary of EAFB. The first would be remaining undisturbed lands west of EAFB, from the military boundary to Sierra Highway, and from Avenue B on the south to the Kern County line (see HCA-3). The second area would be a strip of land south of the base boundary extending from the discharge channel of Amargosa Creek east for a distance of six miles. This segment lies between Avenues E and F, and Sierra Highway and 40th Street East and encompasses primarily undisturbed and moderately disturbed saltbush scrub. Two known occurrences of Hoover s woolly-star, a rare plant recently removed from the federal threatened species list, are within this proposed conservation area. One section of land between the base boundary at Avenue D

south to Avenue E between 40th Street East and 30th Street East would also be included. The proposed agricultural area to be supplied with wastewater from the Los Angeles County Sanitation Districts forms the eastern boundary of this part of the conservation area.

The third segment would extend between Avenues D and E from 100th Street East to 1.5 miles east of 120th Street East at the base boundary.

- Existing structures and dwellings and occupied residential lots are not part of the proposed conservation area. The ultimate boundaries may change via adaptive management, depending on the results of surveys, changing land uses and the ability to acquire lands from willing sellers.

- (P-7) Establish an **Incidental Take Area (ITA)** within the City of Lancaster. Developments within the ITA would be required to provide mitigation fees as provided by Section 2.2.2.2 (above).

- (P-8) Suggest that the consultant s recommended boundaries for the Antelope Valley Significant Ecological Area in Los Angeles County be adopted.

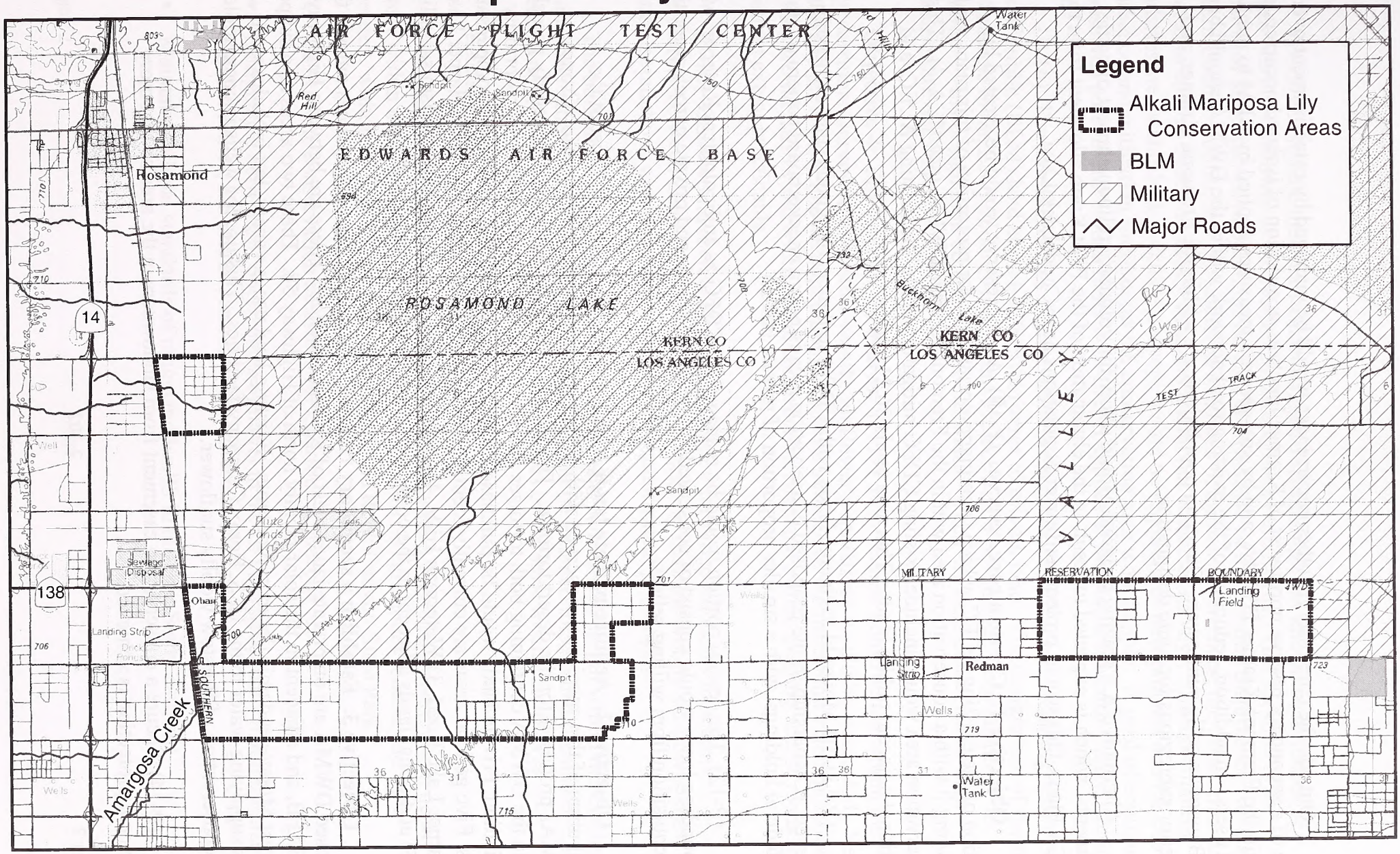
Objective 2. Isolated alkali springs, seeps, and meadows: Acquire Paradise Spring through land exchange or purchase if private owner is willing. Conserve the smaller seeps on BLM lands adjacent to Paradise Spring. Acquire Rabbit Springs or arrange for the conservation of the alkali seep with the private landowner. (See P-2)

(P-9) Lacking willing sellers of Paradise Springs and Rabbit Springs, San Bernardino County would review any proposals for discretionary permits and require avoidance of the rare plant habitat and protection of the water sources supplying the wetland habitat. Proposals for development, mining, or water extraction near the springs along the Helendale Fault (Box S Springs, Cushenbury Springs and Rabbit Springs) would be reviewed by San Bernardino County for compatibility with protection of the mariposa lilies and the surface water supply. Botanical surveys should be required in these areas, which may support additional rare species of alkali-adapted flora.

2.2.4.10.5 Barstow Woolly Sunflower

Conservation of Barstow woolly sunflower is based on establishment of a core reserve containing the best habitat and most of the known populations outside Edwards Air Force Base (EAFB). The current compatibility of military operations at EAFB with conservation of the Barstow woolly sunflower, as outlined in the EAFB Integrated Resource Management Plan, is recognized but is not part of the analysis of conservation and incidental take considered by Alternative A.

Alkali Mariposa Lily Conservation Areas



West Mojave Plan FEIR/S
Map 2-12

7/29/04

Scale: 1 : 120,000

0 1 2 3 Km

0 1 2 3 Miles

Outside the core reserve, other occurrences would be managed by establishment over time of a secondary reserve northwest of Kramer Junction, acquisition of isolated occurrences within the Fremont-Kramer DWMA, and by site-specific measures applied by BLM to public land users. In addition, reduction of the existing road network within the DWMA should benefit the Barstow woolly sunflower. The main populations are within the Fremont, Kramer, and Superior subregions for route designation.

Alternative A s grazing program would allow for voluntary relinquishment of cattle allotments, which is expected to result in the elimination of the Pilot Knob allotment from the CDCA Plan. This would protect sunflower populations near Cuddeback Lake.

Objective 1. Create a core reserve: (P-10) A core reserve would be created by deletion of the existing ACEC, which is an inappropriate size for protection of this plant, and replacing it with a conservation area within the Fremont-Kramer DWMA (see HCA-3). This conservation area would include existing CDFG mitigation lands, the existing ACEC, and additional adjacent public lands. This area totals 36,211 acres.

(P-11) BLM would exchange lands with CDFG so that a contiguous state ownership is achieved. (Ownership in the proposed conservation area is now a checkerboard pattern of state and federal holdings, with a smaller proportion of private lands.)

(P-12) The central portion would be managed by CDFG as an Ecological Reserve, while surrounding lands would consist of conserved public (BLM) lands and private parcels prioritized for acquisition from willing sellers.

Objective 2. Acquire private lands within the DWMA: (P-13) Most of the distribution of this species is conserved within the Fremont-Kramer and Superior-Cronese DWMAs proposed for the desert tortoise. The Implementing Authority would identify parcels within the DWMA containing both tortoises and Barstow woolly sunflowers for first priority acquisition. Private lands would be purchased from willing sellers over time using compensation funds. Five general areas are currently identified that meet these criteria: 1) North Harper Lake, 2) Harper Lake Road, 3) Waterman Hills, 4) along the Kramer to Harper Lake transmission line, and 5) additional lands adjacent to the core reserve northeast of Kramer Junction.

Objective 3. Establish a secondary reserve: The only known occurrences outside the proposed DWMA are on private lands west of Kramer Junction. These are between Highway 58 and EAFB, and adjacent to the solar facility north of Highway 58. These two areas also support the west Mojave endemic desert cymopterus. Existing land use is vacant, but includes well fields supplying water to the U. S. Borax Company facilities. This use for wells is compatible with conservation of Barstow woolly sunflower.

(P-14) Secure a conservation easement from landowners in the area so that more permanent protection is achieved.

(P-15) Designate the area west of Kramer Junction that has known occurrences of Barstow woolly sunflower as the North Edwards Conservation Area. This location is an extension of large known populations on EAFB. Because of the existing disturbance, such as the Kern County landfill, and the scattered locations of known occurrences, the boundaries are expected to change based on monitoring and additional botanical surveys. Until permanent boundaries are established, botanical surveys would be required for new projects and the cap on disturbance and mitigation formula for the conservation area would apply. A goal of contiguity of conserved parcels and connectivity with EAFB applies to the North Edwards Conservation Area.

(P-16) The North Edwards Conservation Area totals 12,702 acres, including 1,143 (9%) acres of public (BLM) land and 11,159 (91%) acres of private land. The designation of the two BLM parcels in the Land Tenure Adjustment Project would be changed from disposal to retention. This designation could revert to disposal when the final conservation area boundaries are determined.

Objective 4: Site-specific measures: (P-17) Prior to new construction within the utility corridors, surveys for Barstow woolly sunflower populations would be conducted. Newly located and previously known populations would be avoided to the maximum extent practicable. Utilities would narrow the width of the construction zone and utilize existing access roads to the maximum extent practicable.

(P-18) BLM would review Plans of Operation for proposed mines to achieve compatibility between mining and conservation of existing Barstow woolly sunflower sites. Existing populations would be avoided to the maximum extent practicable.

The outlying Coolgardie Mesa occurrences near Williams Well fall within the Coolgardie Mesa Conservation Area. Mineral withdrawals would be initiated for essential habitat of Lane Mountain milkvetch, which overlaps with occurrences of Barstow woolly sunflower.

2.2.4.10.6 Charlotte s Phacelia

Charlotte s phacelia is a West Mojave endemic with a very small distribution, nearly entirely within the planning area. Most of the sites (30 of 37) are under federal and state protection, within ACECs, Wilderness Areas, and Red Rock Canyon State Park.

(P-19) The conservation measures for Charlotte s phacelia are:

- Designate a network of open routes of travel in the El Paso Mountains that minimize parallel routes, hill climbs, and straying off established paths.
- Maintain regional standards of rangeland health in the East Sierra canyons.

Take of Charlotte s phacelia applies to new occurrences that may be detected in the future on private lands and to a potential small loss of plants from vehicle travel in the El Paso Mountains and grazing in the east Sierra Canyons. The limit on incidental take would be 50 acres.

2.2.4.10.7 Crucifixion Thorn

Crucifixion thorn is found within the western Mojave Desert as isolated plants or as disjunct communities of crucifixion thorn woodl and. Two occurrences of single plants are known from private land. Recent acquisition by BLM and The Wildlands Conservancy has placed the remaining occurrences into public ownership. The conservation plan relies on management of the sites where the plants are located and the designation of a new conservation area at Pisgah (Map 2-12B). Most known sites are within the Superior-Cronese DWMA established for protection of the desert tortoise. The occupied habitat lies within the Newberry-Rodman and Coyote subregions for route designation.

BLM would establish the Pisgah area as an Area of Critical Environmental Concern (see HCA-3). The existing mining operation at Pisgah Crater would not be restricted by these proposals.

(P-20) Larger populations would be signed to notify campers that firewood harvesting is prohibited.

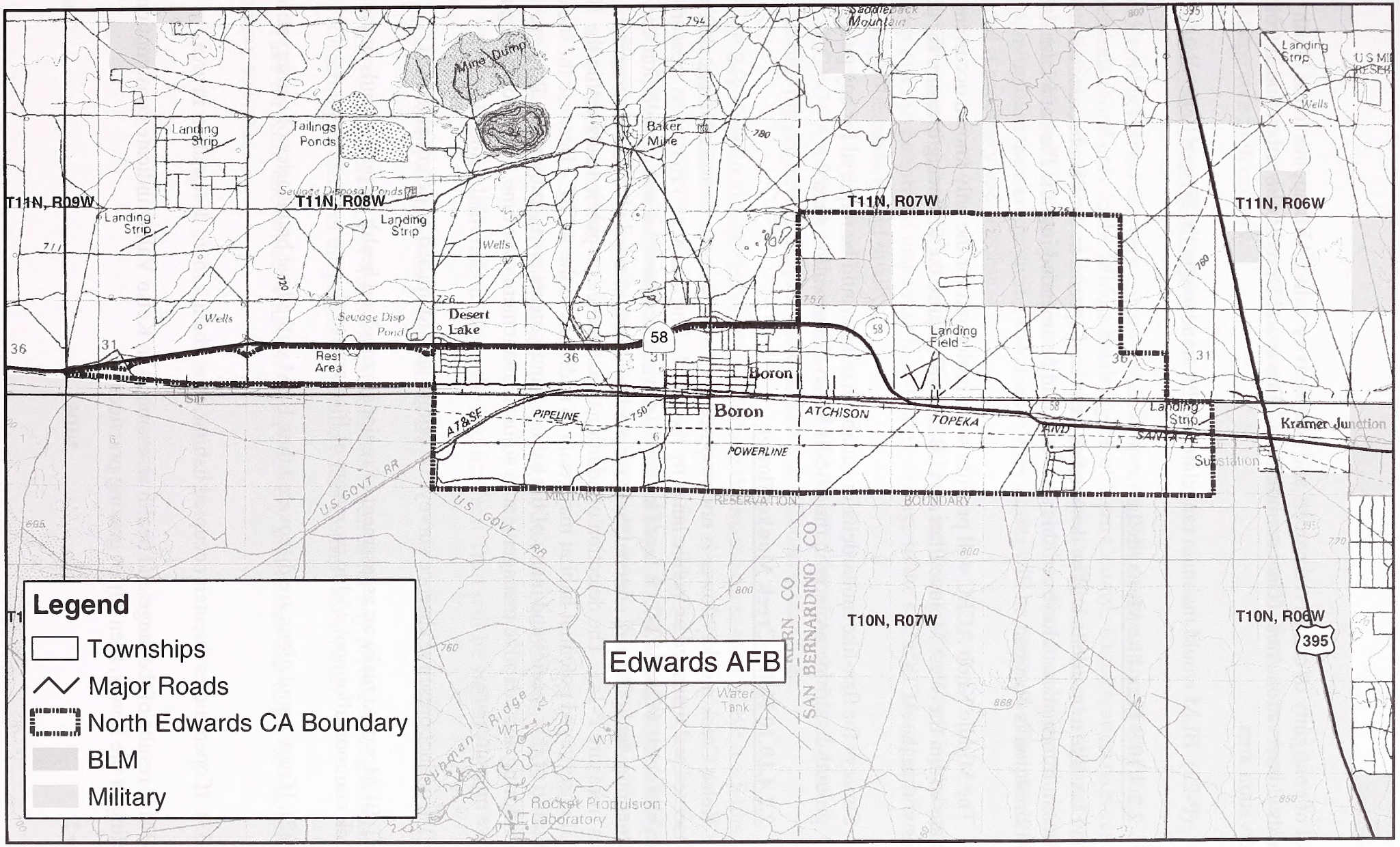
2.2.4.10.8 Desert Cymopterus

The West Mojave endemic desert cymopterus is found in widely separated locales of sandy soil formed by wind erosion off desert playas. The largest populations are on Edwards Air Force Base. Within the West Mojave Plan area, the plant is known from scattered occurrences west of Kramer Junction, north of Hinkley, near Cuddeback Lake, and in the Superior Valley.

(P-21) Land disturbing projects within suitable habitat located within the Habitat Conservation Area (which includes the North Edwards Conservation Area, the Fremont Kramer and Superior Cronese DWMAs) would be required to perform botanical surveys for this species, and if the plant is located, to avoid all occurrences to the maximum extant practicable. Incidental take would be limited to 50 acres.

(HCA-3) The proposed North Edwards Conservation Area would be established for protection of the desert cymopterus (see HCA-3 and Map 2-12A). This location is an extension of known populations on EAFB. Because of the existing disturbance, such as the Kern County landfill, and the scattered locations of known occurrences, the boundaries are expected to change based on monitoring and additional botanical surveys. Until permanent conservation area boundaries are established, botanical surveys would be required for new projects and the cap on new allowable ground disturbance and mitigation formula for conservation areas would apply.

North Edwards Conservation Area



West Mojave Plan FEIR/S
Map 2-12A

10/1/04

Scale: 1 : 100,000

0 2 4 Km

0 1 2 3 Miles

A goal of contiguity of conserved parcels and connectivity with EAFB applies to the North Edwards Conservation Area. The communities of Boron and Desert Lake are excluded from the conservation area.

(P-22) BLM would maintain rangeland health standards in the Harper Lake allotment.

2.2.4.10.9 Flax-like Monardella

Flax-like monardella will be dropped as a covered species in the Plan because of insufficient information. However, this species could be amended into the Plan at a later date if new information is obtained.

The Middle Knob ACEC will provide some protection for the only known occurrence of this plant within the West Mojave Plan area. BLM will require the following measure for this species within the ACEC:

- Surveys for flax-like monardella in suitable habitat would be required for any public ground-disturbing projects in the Middle Knob Conservation Area.

2.2.4.10.10 Kelso Creek Monkeyflower

Kelso Creek monkeyflower is not proposed for incidental take permit coverage, but will be conserved and managed on public lands by the BLM. The primary conservation measure is the establishment of an ACEC on lands known to provide occupied habitat. In addition, the Implementing Authority will conduct wet year surveys of rare annual plants, including this species (measure P-1a). The detection of additional occurrence on public lands within the 1000 acres of unsurveyed potential habitat may result in additions to the ACEC. Because the local distribution of this species and many of the habitat requirements are unknown, the Plan provides for monitoring and adaptive management to adjust management over time. The monitoring and adaptive measures are:

(M-34) Conduct presence absence surveys on public land identified as potential habitat.

(LG-9) BLM would make an assessment of regional rangeland health on public lands in the Rudnick common allotment within two years of Plan approval.

(AM-32) If new populations are discovered then BLM will adjust boundaries of conservation area.

(AM-33) If open routes threaten occupied habitat, then change route designation in area.

(AM-34) If results of the rangeland health assessments in Kelso Valley indicate consumption or trampling of the flower, then adjust grazing practices.

(AM-35) If newly discovered populations on private land are found, then pursue land purchase or exchange on a high priority.

2.2.4.10.11 Kern Buckwheat

Kern buckwheat is a very narrow endemic species with substrate-specific habitat requirements found only in the Middle Knob region of Kern County. Conservation requires avoidance of all occurrences on private lands and restoration and enhancement of habitat on public lands. If wind turbines are replaced and subject to another discretionary permit from Kern County, mitigation measure requiring avoidance of the plants will be imposed. The plants will be fenced if necessary and feasible.

The major threat to the occupied habitat is vehicle intrusions. When the clay substrate is wet, deep ruts can be formed that cause long-lasting damage to the surface. Management of the habitat on public lands would involve:

- (HCA-3) Avoidance of this species would be required for any public land ground-disturbing projects in the proposed Middle Knob Conservation Area.

- (P-24) Construction of vehicle barriers along the main access road where it adjoins occupied habitat.

- (P-25) Fencing on both sides of the road near the Sweet Ridge population. A vehicle turnaround and parking area would be restored so that traffic passes by, rather than on, the buckwheat habitat.

- Establishment of the Middle Knob Conservation Area and ACEC (see HCA-3).

- (P-25a) Pebble plains habitat along the Pacific Crest Trail will be signed.

Conservation measures on private lands are:

- (HCA-3) Avoidance of this species would be required for any private land ground-disturbing projects in the proposed Middle Knob Conservation Area.

Take for Kern buckwheat would be limited to very small areas that might be impacted by restoration activities.

2.2.4.10.12 Lane Mountain Milkvetch

The conservation strategy for this species is to provide occupied habitat with reserve-level management. Two conservation areas would be designated: the Coolgardie Mesa Conservation Area and the West Paradise Conservation Area (see Map 2-10). The boundaries of the conservation areas, which are in two separate blocks, include all known populations and most of the granitic substrate on which they occur outside the Fort Irwin expansion area. The areas total 14,597 acres. Conservation measures would include the following:

- (P-26) BLM would require botanical surveys prior to issuing any use permits. No permits would be issued which allow take of this species (projects would have to be relocated).

- (P-27) No grazing would be permitted within the conservation area.

- (P-28) Route designation would identify acceptable open routes of travel. Closed routes would have a high priority for obliteration. Fencing of the approved routes would be installed as necessary, with signs advising the public that the area is closed to vehicle travel because of endangered species conservation.

- (P-29) All private lands within the West Paradise Conservation Area and occupied habitat within the Coolgardie Mesa Conservation Area would be acquired, to the extent feasible and from willing sellers only.

- (P-30) Lands within the conservation areas would be withdrawn from mineral entry. Claimholders with valid existing rights will be compensated.

- (P-31) The Management Plan for the Rainbow Basin Natural Area would be revised to incorporate specific measures that protect the Lane Mountain milkvetch. (See Appendix D on ACEC changes.) These measures include closing specified routes of travel, a small mineral withdrawal, and adding protection of the Lane Mountain milkvetch as a goal of the management plan.

- (P-32) Claimholders should be notified of the presence of endangered plants. Restrictions on casual use that involves ground disturbance within the Coolgardie Mesa Conservation Area would be developed as necessary.

2.2.4.10.13 Little San Bernardino Mountains Gilia

Conservation of this relatively unknown species is based on 1) limitation of take until additional information on distribution and habitat preferences is developed, 2) restrictions on disturbance within 100' of the banks of desert washes within the range, and 3) planning for flood control without channelization of the stream courses.

(P-33) Designate a Special Review Area, which would be in two parts. The first would be between Highway 62 and the northern boundary of Joshua Tree National Park from the west edge of the City of Twentynine Palms to the community of Joshua Tree west of Park Avenue. The second Gilia area would be the same area as that prescribed for the desert tortoise, called the Copper Mountain Mesa SRA. The City of Twentynine Palms and the Town of Yucca Valley are outside the proposed Special Review Area. Precise boundaries of the SRA would be one of the first implementation tasks.

Within the SRA, applicants for discretionary development within 100' of existing stream channels would be required to protect the integrity of the stream channels. BLM will retain parcels falling within this more narrowly defined boundary, unless land exchanges or sale would enhance gilia conservation. The existing hydrology should be maintained 1/4 mile away from Highway 62. Road crossings of washes should be at grade (Arizona crossings) instead of fill and culverts. San Bernardino County would require setbacks of 100' from the outer banks of washes within the species habitat and seek to avoid take of existing known populations. Flood control and conservation easements would be established on private lands containing this species. Surface-disturbing activities, including extraction of aggregate materials would be prohibited within easements. San Bernardino County Flood Control would utilize floodplain management rather than structural alternatives for flood control in washes supporting this species.

The standard for avoidance within the stream channel edges means that habitat compensation would not normally be required. Only in those cases where avoidance is proven to be infeasible, such as for reasons of public safety, would mitigation (habitat compensation) be chosen over minimization (avoidance and establishment of easements). In that case, the compensation ratio would be 5:1.

Incidental take would generally be limited to areas greater than 100' from washes occupied by the species and not exceeding 50 acres of occupied habitat. Conservation (via easements) would be required to keep pace with incidental take.

(P-34) Channelization of upper Big Morongo Creek, Little Morongo Creek, and Dry Morongo Creek northwest of Highway 62 would be prohibited in order to maintain fluvial processes supporting occurrences in the Coachella Valley. Improvements (e.g. culverts) within 1/4 mile of Highway 62 in these washes would be allowed.

(P-35) BLM would pursue land exchanges to acquire known sites near JTNP. BLM would retain scattered public lands south of Joshua Tree bordering Joshua Tree National Park and change the multiple use class from Unclassified to M.

2.2.4.10.14 Mojave Monkeyflower

Conservation of Mojave monkeyflower is based on establishment of two core reserves that include the majority of the known populations. These reserves would become Areas of

Critical Environmental Concern on BLM managed lands in the Brisbane Valley and west of the Newberry Mountains (see HCA-3).

Objective 1. Brisbane Valley Unit: BLM would retain 16.5 sections of public land, comprising approximately 10,633 acres, between the Mojave River and Interstate 15. This two-mile wide by seven mile long area would become one core reserve for the Mojave monkeyflower and would be designated an ACEC. Private inholdings within the conservation area would not be affected. Existing and proposed mining on these inholdings could continue under existing requirements of the local jurisdiction. Prescriptions specified in the ACEC Plan would include designation of routes of travel, retention of public lands for conservation, and mitigation and monitoring procedures. Ground disturbing activities in the conservation area would provide mitigation at a 5:1 fee amount ratio. Sheep grazing would be discontinued in the Conservation Area (LG-25).

(P-36) The ACEC lands would be removed from the land base available for exchange in the Land Tenure Adjustment program.

(P-37) To address uncertainty about the configuration of the conservation area, a survey incentive area would be established on all sides of the conservation area and would include all of the mining area. Within the survey incentive area, the f ollowing mitigation prescriptions would apply:

1. All ground disturbing activities where the applicant does not perform a botanical survey to determine the presence or absence of the Mojave monkeyflower would be required to provide mitigation at a 2:1 fee amount ratio.

2. Applicants who perform a botanical survey and do not detect the Mojave monkeyflower would provide mitigation at the planwide fee amount ratios (1:1 for undisturbed lands).

3. If the botanical survey detects Mojave monkeyflower and the ground disturbing activities would avoid the plants, no additional mitigation would be required.

4. If the botanical survey detects Mojave monkeyflower and the plants are to be eliminated, mitigation would be provided at a 2:1 fee amount ratio. This ratio would only be applied to the acreage of occupied habitat. San Bernardino County would make a determination of what constitutes a significant population requiring this ratio, and would determine or approve the occupied acreage where the ratio is applied. The County would consult with the Scientific Advisory Committee in determining what constitutes a significant population .

5. No Mojave monkeyflower surveys would be required on 0.5:1 compensation lands, which reflect existing disturbance. Maps of 0.5:1 and undisturbed lands would be established prior to Plan approval, and would apply to the entire range of Mojave monkeyflower.

Botanical surveys must be performed in a year of sufficient rainfall so that the Mojave monkeyflower is evident and identifiable. Surveys should include inspection of known reference sites to determine the detectability of this species. The California Native Plant Society has prepared Botanical Survey Guidelines, which have been adopted by CDFG for projects undergoing CEQA review (CDFG, 2000). Use of these guidelines is recommended.

Mining Area: (P-38) In order to accommodate the unique operations of the mining industry, a mining area has been illustrated in the southern Brisbane Valley near Oro Grande. The mining area encompasses 9,358 acres, of which 62% (5,792 acres) is private land and 38% (3,566 acres) is public land. Mineral production from this area has a substantial economic benefit to residents of the western Mojave Desert and supplies essential materials to a wide market in southern California and beyond.

In the mining area, all existing Plans of Operation and SMRA Reclamation Plans are not subject to additional mitigation. Any discretionary permit involving modification or variances within a Plan of Operations or Reclamation Plan which does not affect additional lands with additional disturbance outside the originally permitted area would be exempt from new mitigation for the Mojave monkeyflower. Renewals of permits at the termination of the SMRA permit are exempt from mitigation if they do not involve additional lands.

At the discretion of the mining industry, a mitigation or conservation bank can be established in the mining area. After botanical surveys are completed, any landowner or group of landowners can designate a reserve containing substantial numbers of Mojave monkeyflowers within the mining area and receive credits for the conservation achieved. The terms of the compensation for the credits would be private and determined by the affected parties. The initial assignment of credits (such as one unit of credit per acre of occupied monkeyflower habitat) and the accounting of incidental take and credits applied to different projects would be reported to and approved by the Implementation Team and the wildlife agencies.

The mining industry can submit a proposal to the Implementation Team for conservation of the Mojave monkeyflower in the mining area as a whole and obtain approval as the ultimate and final requirements for conservation of this species in the mining area. The conserved lands would meet equivalent protective standards as those in the Brisbane Valley unit or could be an addition to the Brisbane Valley unit.

Objective 2. Daggett Ridge Unit: A second unit would include known occurrences west of the Newberry Mountains Wilderness near Daggett Ridge. Within this area of 36,424 acres, 27% (9,831 acres) of the land is private, 71% (25,997 acres) is BLM, and 2% (596 acres)

is state-owned. The BLM managed lands would be designated an Area of Critical Environmental Concern. These lands are within the proposed Newberry-Rodman Desert Wildlife Management Area established for the protection of the desert tortoise.

(P-39) Within this area, BLM would designate routes of travel with the goal of eliminating routes within washes, unnecessary parallel routes, and routes bisecting populations of Mojave monkeyflower. This network is contained within the Newberry-Rodman and Ord Mountains route designation subregions.

(P-40) Additional private lands would be acquired west of the Newberry Mountains as funds become available.

Objective 3. Site-specific management: The Waterman Hills occurrences are within a proposed DWMA. The 1% cap on developments within the DWMA, along with route designation and other measures to protect the desert tortoise, would also protect the Mojave monkeyflower.

(P-41) Proponents for development within one mile of the Waterman Hills occurrences would conduct surveys for Mojave monkeyflower to determine potential impacts to this species. Avoidance measures would be formulated on a case-by-case basis. Because the Waterman Hills population area contains desert tortoise, Barstow woolly sunflower, and Mojave monkeyflower, this area would receive a high priority for acquisition of private land within the Superior-Cronese DWMA.

Utility Corridor O traverses the western edge of the Brisbane Valley. Utility Corridor D, the Boulder Corridor, traverses the southeast edge of the Brisbane Valley unit and bisects the eastern part of the conservation area near Daggett Ridge.

(P-42) New utility projects, including proposals for wind energy development or communications sites, within the conservation areas would be required to perform botanical surveys and avoid existing populations to the maximum extent practicable. If avoidance is not feasible, mitigation must be provided at the 5:1 ratio for the area of new ground disturbance within the conservation area. The Implementation Team would determine if construction monitoring is necessary for new utility projects and prescribe monitoring requirements.

2.2.4.10.15 Mojave Tarplant

The known extant populations of Mojave tarplant within the western Mojave Desert are found in remote, protected locations and face no immediate threats. This plant is relatively unknown, so there is some likelihood that new occurrences would be detected. The conservation strategy is based on maintenance of existing protections and monitoring and adaptive management.

(P-44) Maintain the cattle guards and fencing at Short Canyon.

(P-45) Revise the ACEC Plan for Short Canyon to specify protection of Mojave tarplant as a goal of the plan. In addition, monitoring measures would be added to the Plan (see M-56).

(P-46) Perform an initial (within two years of Plan adoption) census estimating numbers and acreage of occupied habitat of at Short Canyon and Owens Peak to provide a baseline.

Take is proposed only for new locations where Mojave tarplant might be detected on private lands. A cap on the level of incidental take of 50 acres would be imposed and. the permit authority would cease when the cap is reached. Proposed incidental take on private lands must not eliminate more than 50% of the occupied habitat, with the remainder dedicated to conservation. Fifty percent of newly detected populations must be conserved.

2.2.4.10.16 Ninemile Canyon Phacelia

This plant is a West Mojave endemic with a very restricted range. It is found primarily on public lands.

Take is proposed only for new locations where Ninemile Canyon phacelia might be detected on private lands. A cap on the level of incidental take of 50 acres of occupied habitat would be imposed and the permit authority would cease when the cap is reached. Proposed incidental take on private lands must not eliminate more than 50% of the occupied habitat, with the remainder dedicated to conservation, including 50 percent of newly detected populations.

2.2.4.10.17 Parish s Phacelia

Designate a Parish s Phacelia Conservation Area (see HCA-3). The boundaries of this region correspond to the limits of the known distribution and the land between the playas. Ownership is 386 acres (43%) of private and 512 acres (57%) of public land. Incidental take would be limited to 50 acres of occupied habitat. Within the conservation area, the following prescriptions would apply:

- (HCA-3) The occupied habitat on private land within the conservation area (149 acres) would be acquired, assuming a willing seller.

- (P-48) San Bernardino County would insure that projects proposed on the dry lakes with occupied habitat for this species avoid and minimize take of this species to the maximum extent practicable.

- (HCA-3) Vehicle traffic would be prohibited on the playas. BLM would designate these dry lakes as closed to motor vehicle traffic and would place signs at the edge of the playas.

- (P-50) BLM would insure that new utilities using this portion of Corridors D and Q site facilities to avoid the known populations or require restoration of the playa habitat. Construction stipulations that have been effective in the past include stockpiling of the top six inches of soil in a manner where it is not subject to wind erosion, followed by respreading of this soil over the disturbed right-of-way.

2.2.4.10.18 Red Rock Poppy

Red Rock poppy is a narrow endemic plant found in the El Paso Mountains, with one reported outlier northeast or Red Mountain. The species is protected within Red Rock Canyon State Park. Within the BLM-managed lands in the El Paso Mountains, no significant threats are present. The conservation strategy for this species consists of designating a network of open routes of travel that minimize parallel routes, hill climbs, and straying off established paths.

Incidental take of Red Rock poppy would apply only to newly-detected populations found on private land. Take would be limited to 50 acres of occupied habitat. Fifty percent of newly detected populations would be conserved.

2.2.4.10.19 Red Rock Tarplant

Like the Red Rock poppy, the Red Rock tarplant is a narrow endemic plant found in the El Paso Mountains. The species is protected within Red Rock Canyon State Park. Within the BLM-managed lands in the El Paso Mountains, no significant threats are present. The conservation strategy for this species consists of designating a network of open routes of travel that minimize parallel routes, hill climbs, and straying off established paths.

Incidental take of Red Rock tarplant would apply only to newly detected populations found on private land. Take would be limited to 50 acres of occupied habitat. Fifty percent of newly detected populations would be conserved.

2.2.4.10.20 Reveal s Buckwheat

Botanists have reported a disjunct occurrence of Reveal s buckwheat on private land in the Jawbone Butterbredt ACEC, and additional locations could be detected in the future.

(P-51) Conservation of this species would be by avoidance of impacts at the known location, followed by monitoring and adaptive management. If additional botanical surveys better define the distribution of this species in the Jawbone Canyon area, a site-specific conservation plan would be developed. This could include posting signs to discourage off-road vehicle travel or placement of fences to keep out livestock.

2.2.4.10.21 Short-joint Beavertail Cactus

All known occurrences of the short-joint beavertail cactus are on private land in the San Gabriel Mountains foothills between Palmdale and the Cajon Pass. Existing rural housing in the Phelan and Oak Hills areas fragments habitat within San Bernardino County.

Conservation for short-joint beavertail cactus consists of designation of the Big Rock Creek Conservation Area, where a substantial unfragmented population can be protected (see HCA-3). Additional lands within existing Significant Ecological Areas would be conserved by the zoning limitations and development review process established by Los Angeles County. The SEA boundaries may change in the future, providing additional protection to this species.

(P-52) San Bernardino County would review land division and development proposals in the Oak Hills area to insure minimization of impacts to short-joint beavertail cactus habitat.

(B-9) BLM would remove scattered parcels within existing SEAs containing suitable and occupied habitat from the LTA Program disposal zone and change the multiple use class from Unclassified to M. BLM would implement these same measures for parcels outside the SEAs in the San Gabriel Mountains foothills.

Take would be allowed on private lands in all areas away from the designated washes, outside the Significant Ecological Areas and the Big Rock Creek Conservation Area, and within the Palmdale city limits.

2.2.4.10.22 Triple-ribbed Milkvetch

Triple-ribbed milkvetch occurs in the Morongo Valley region, extending to the San Bernardino Mountains and Little San Bernardino Mountains into the Coachella Valley where it borders the boundary of the West Mojave Plan. This species is so rare that no take is anticipated, with the possible exception of improvements to Highway 62 along the grade between Desert Hot Springs and Morongo Valley.

(P-53) BLM would protect this plant by requiring avoidance of all known locations on public lands. San Bernardino County Flood Control District would limit improvements to Big Morongo Creek and Dry Morongo Creek to areas within .m ile of Highway 62.

(P-54) Botanical surveys would be required for ground-disturbing projects on private lands located within five miles of existing known locations for this species. Proposed projects on private land where this plant is detected would be required to avoid the occupied habitat. These parcels would be identified as priorities for acquisition.

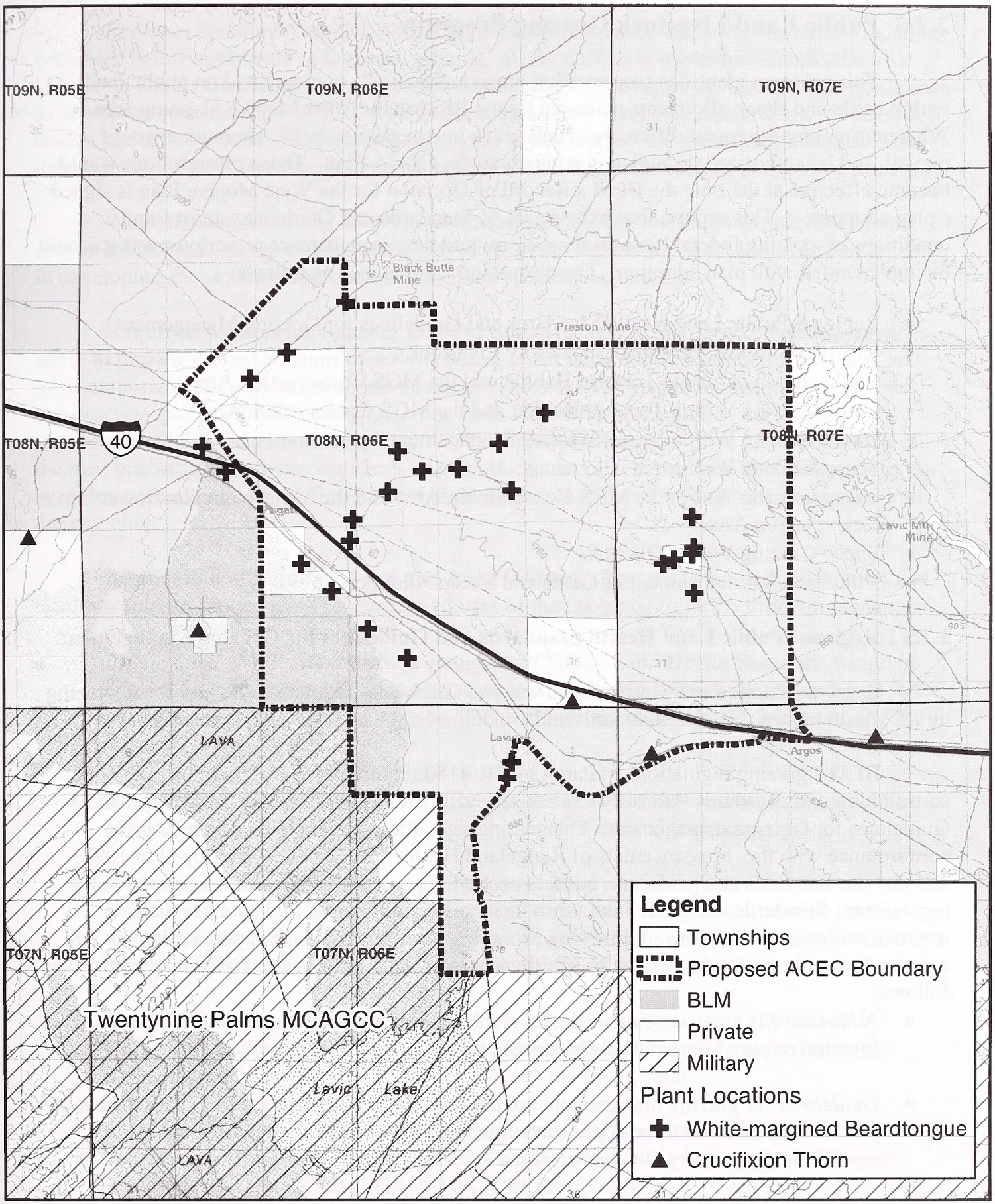
2.2.4.10.23 White-margined Beardtongue

This species is a disjunct with a very limited range within California, all within the West Mojave. Incidental take would be limited to 50 acres of occupied and potential habitat.

(P-55) Acquire one private parcel where this plant occurs within the proposed Pisgah ACEC if feasible.

Designate the Pisgah area as an ACEC (see HCA-3, Map 2-12B). Designate routes within the ACEC as open or closed and restore or block routes to be closed. Change the multiple use class from M to L.

Pisgah CDCA Plan Amendment



West Mojave Plan FEIR/S
Map 2-12B

Scale: 1 : 100,000

0 2 4 Km

0 1 2 3 Miles

7/29/04

2.2.5 Public Land Livestock Grazing Program

This program identifies conservation prescriptions to be implemented on public land within cattle and sheep allotments managed by the BLM in the West Mojave planning area. Where current management differs from that given in Alternative A, the alternative would prevail, and be authorized through amendments to the CDCA Plan. These prescriptions would become effective at the time the BLM s Record of Decision for the West Mojave Plan is signed (plan adoption). This section lists existing BLM Standards and Guidelines, term s and conditions of existing federal biological opinions, and new management prescriptions that would be implemented with plan adoption. The discussion is organized as follows:

- Regional Public Land Health Standards and Guidelines for Grazing Management
- Utilization of Key Perennial Species by Livestock
- Cattle Grazing Outside Tortoise Habitat and the MGS Conservation Area
- Cattle Grazing Within Tortoise Habitat and the MGS Conservation Area
- Cattle Grazing Within Desert Wildlife Management Areas
- Sheep Grazing Within All Allotments
- Sheep Grazing Within the MGS Conservation Area and the Mojave monkeyflower Conservation Area
- Sheep Grazing Within DWMAs
- Voluntary Relinquishment of Cattle and Sheep Allotments

2.2.5.1 Regional Public Land Health Standards and Guidelines for Grazing Management

Regional Public Land Health Standards and Guidelines regulate cattle and sheep grazing on BLM-administered lands. Standards and Guidelines are listed and described below.

BLM s grazing regulations in Part 43 CFR 4180 require that State Directors, in consultation with Resource Advisory Councils, develop Standards of Rangeland Health and Guidelines for Grazing management. The grazing regulations require that standards be in conformance with the Fundam entals of Rangeland Health (BLM policy developed in 1993) and that the standards and guidelines address each of the guiding principles as defined in the regulations. Standards and guidelines are to be incorporated into BLM s land use plans to improve ecological conditions. Improving ecological conditions is based upon attainment and maintenance of basic fundamentals for healthy systems. Standards and guidelines are defined as follows:

- A *Standard* is an expression of the level of physical and biological condition or degree of function required for healthy, sustainable rangelands.

- *Guidelines* for grazing management are the types of grazing management activities and practices determined to be appropriate to ensure that the standards can be met or significant progress can be made toward meeting standards.

Regional Standards apply to all BLM lands and programs, while the *Regional Guidelines* presented below apply only to livestock grazing. BLM staff, in consultation with the BLM s California Desert District Advisory Council, has developed the regional standards and guidelines to satisfy the requirements of BLM s strategic plan, comply with the fundamentals of rangeland health, and address each of the guiding principles as required by the grazing regulations. The development of guidelines for grazing management also addresses each of the guiding principles.

While the definition and adoption of standards and guidelines applies specifically and only to BLM lands, the spirit of initiative is reflected throughout the West Mojave planning area in developing the strategic approach to managing species and habitats.

Required Actions on Grazing Leases: Standards and grazing management guidelines apply to grazing related portions of activity plans, terms and conditions of permits, leases, and other authorizations, and range improvement activities such as vegetation manipulation, fence construction and development of water. For lands leased for grazing uses, the grazing regulations require the authorized officer to t ake appropriate action prior to the beginning of the next grazing season when standards or guidelines are not achieved and livestock grazing has been determined to be a significant factor in the failure to achieve the standard or comply with the guideline.

Application of Standards in Land Use Planning: Regional Standards of Public Land Health would be applied to all resources and uses of the public lands in the following manner:

- *Public Land Health Standards.* A single set of Public Land Health Standards would be applied desert-wide and to all resources and uses. Standards have their foundation in the physical and biological laws of nature. These laws are consistent regardless of the resource or use.

- *Assessment of Public Land Health.* The health of public lands and resources would be assessed using the Standards as the measurement of desired function.

- *Assessment Scale.* The health of public lands would be assessed on a landscape/watershed scale. While it may be useful and necessary to examine certain environmental components on a smaller scale, or at various scales, it is intended that overall Public Land Health be made at a landscape or watershed scale.

- *Health Determination.* Since Standards are a statement of goals for physical and biological function, determinations would be based strictly on the result of resource assessments and be independent of the uses on the public land.

- *Resource Objectives.* Resource management objectives are decisions made in consideration of resource values and capabilities and use needs through land use and activity plans. Public Land Health would be used to determine if resource management

objectives are being met. In some cases, particularly where intensive land uses are allowed, resource management objectives could be met while the Public Land Health determination may indicate non-conformance with the Standards.

- *Causal factors*. Where public land health assessments indicate that resource management objectives are not being met, a determination would be made as to the causal factors.

- *Action/Adaptive Management.* Where public land health does not conform to resource management objectives, appropriate action - including changes to land use or activity plans - would be initiated using existing regulatory authorities for each authorized activity. In the case of livestock grazing the regulations require that the authorized officer take appropriate action prior to the beginning of the next grazing season when standards or guidelines are not achieved and livestock grazing has been determined to be a significant factor in the failure to achieve the standard or comply with the guideline.

Application of Standards in NEPA Analysis: Analyses of resources and issues guided by Standards would help NEPA review of projects. Consideration of standards should improve identification and analyses of:

- Relevant resource conditions and ecosystem functions
- Actions in terms of affects on resources and ecosystem functions
- The relationship of biological and physical resources and functions
- The most important resources and functions
- Project design and mitigation
- Cumulative effects
- Short-term and long-term affects
- Project compliance

Goals and Objectives of Standards and Guidelines: Table 2-16 presents the goals and objectives of standards and guidelines.

Table 2-16
Goals and Objectives of Standards and Guidelines

GOALS AND OBJECTIVES	
Goals	Develop Standards that would meet or exceed the National policy for: • Watersheds • Ecological processes • Water quality • Habitats Develop Guidelines to meet National policy and the grazing regulations.
Objectives	Implement Standards as directed by National policy and grazing regulations. Implement Guidelines to conform grazing activities to achieve Standards.

Objective A -- Implement Standards: Manage all activities under the following Regional Standards of Public Land Health.

Soils. Soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, geology, landform, and past uses. Adequate infiltration and permeability of soils allow accumulation of soil moisture necessary for optimal plant growth and vigor, and provide a stable watershed, as indicated by:

- Canopy and ground cover are appropriate for the site;
- There is diversity of plant species with a variety of root depths;
- Litter and soil organic matter are present at suitable sites;
- Microbiotic soil crusts are maintained and in place;
- Evidence of wind or water erosion does not exceed natural rates for the site; and
- Hydrologic and nutrient functions maintained by permeability of soil and water infiltration are appropriate for precipitation.

Native Species. Healthy, productive and diverse habitats for native species, including special status species (Federal T&E, Federally proposed, Federal candidates, BLM sensitive, or California State T&E, and CDD UPAs) are maintained in places of natural occurrence. As indicated by:

- Photosynthetic and ecological processes continue at levels suitable for the site, season, and precipitation regimes;
- Plant vigor, nutrient cycle, and energy flow are maintaining desirable plants and ensuring reproduction and recruitment;
- Plant communities are producing sufficient litter;
- Age class distribution of plants and animals are sufficient to overcome mortality fluctuations;
- Distribution and cover of plant species and their habitats allow for reproduction and recovery from localized catastrophic events;
- Alien and noxious plants and wildlife do not exceed acceptable levels;
- Appropriate natural disturbances are evident; and
- Populations and their habitats are sufficiently distributed and healthy to prevent the need for listing special status species.

Riparian/Wetland and Stream Function. Wetland systems associated with subsurface, running, and standing water function properly and have the ability to recover from major disturbances. Hydrologic conditions are maintained. As indicated by:

- Vegetative cover would adequately protect banks, and dissipate energy during peak water flows;
- Dominant vegetation is an appropriate mixture of vigorous riparian species;

- Recruitment of preferred species is adequate to sustain the plant community;
- Stable soils store and release water slowly;
- Plant species present indicate soil moisture characteristics are being maintained;
- There is minimal cover of invader/shallow-rooted species, and they are not displacing deep-rooted native species;
- Maintain shading of stream courses and water sources for riparian dependent species;
- Stream is in balance with water and sediment being supplied by the watershed;
- Stream channel size and meander is appropriate for soils, geology, and landscape; and
- Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition.

Water Quality.[2] Surface and groundwater complies with objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California State Standards, as indicated by:

- The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen;
- Achievement of the Standards for riparian, wetlands, and water bodies;
- Aquatic organisms and plants (e.g., macro invertebrates, fish, algae, and plants) indicate support for beneficial uses; and
- Monitoring results or other data that show water quality is meeting the Standard.
-

Objective B Conform Grazing Activities: Manage grazing activities with the following regional guidelines.

1. Facilities shall be located away from riparian-wetland areas wherever they conflict with achieving or maintaining riparian-wetland functions.

2. The development of springs and seeps or other projects affecting water and associated resources would be designed to protect the ecological functions and processes of those sites.

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[2]Management Objective: For water bodies, the primary objective is to maintain the existing quality and beneficial uses of water, protect them where they are threatened (and livestock grazing activities are a contributing factor), and restore them where they are currently degraded (and livestock grazing activities are contributing factor). This objective is of even higher priority in the following situations:

i. Where beneficial uses of water bodies have been listed as threatened or impaired pursuant to Section 303(d) of the Federal Clean Water Act;

ii. Where aquatic habitat is present or has been present for Federal threatened or endangered, candidate, and other special status species dependent on water resources: and,

iii. In designated water resource sensitive areas such as riparian and wetland areas.

3. Grazing activities at an existing range improvement that conflict with achieving proper functioning conditions (PFC) and resource objectives for wetland systems (lentic, lotic, springs, adits, and seeps) shall be modified so PFC and resource objectives can be met, and incompatible projects shall be modified to bring into compliance. The BLM would consult, cooperate, and coordinate with affected interest and livestock producers(s) prior to authorizing modification of existing projects and initiation of new projects. New range improvement facilities shall be located away from wetland systems if they conflict with achieving or maintaining PFC and resource objectives.

4. Supplements shall be located a sufficient distance away from wetland systems so they do not conflict with maintaining riparian wetland functions.

5. Management practices shall maintain or promote perennial stream channel morphology (e.g., gradient, width/depth ration, channel roughness, and sinuosity) and functions that are appropriate to climate and landform.

6. Grazing management practices shall meet State and Federal water quality Standards. Where impoundments (stock ponds) and having a sustained discharge yield of less than 200 gallons per day to surface or groundwater are excepted from meeting State drinking water Standards per SWRCB Resolution Number 88-63.

7. In the California Desert Conservation Area all wildfires in grazing allotments shall be suppressed. However, to restore degraded habitats infested with invasive weeds (e.g., tamarisk) prescribed burning may be utilized as a tool for restoration. Prescribed burns may be used as a management tool where fire is a natural part of the regime.

8. In years when weather results in extraordinary conditions seed germination, seedling establishment and native plant species growth shall be allowed by modifying grazing use.

9. Grazing on designated ephemeral rangeland shall be allowed only if reliable estimates of production have been made, an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and adverse effects on perennial species are avoided.

10. During prolonged drought, range stocking shall be reduced to achieve resource objectives and /or prescribed perennial forage utilization. Livestock utilization of key perennial species on year-long allotments shall be checked about March 1 when the Palmer Severity Drought Index/Standardized Precipitation Index indicates dry conditions are expected to continue.

11. Through the assessment process or monitoring efforts, the extent of invasive and/or exotic plants and animals shall be recorded and evaluated for future control measures. Methods and prescriptions shall be implemented, and an evaluation would be completed

to ascertain future control measures.

12. Restore, maintain or enhance habitats to assist in the recovery of federally listed threatened and endangered species. Restore, maintain or enhance habitats of special status species including federally proposed, Federal candidates, BLM sensitive, or California State T&E to promote their conservation.

13. Grazing activities shall support biological diversity across the landscape and native species and micro biotic crusts are to be maintained.

14. Experimental research efforts shall be encouraged to provide answers to grazing management and related resource concerns through cooperative and collaborative efforts with outside agencies, groups, and entities.

Utilization of Key Perennial Species by Livestock: The following prescription would be adopted to govern utilization of key perennial species by livestock in continuous year-long operations:

- (LG-1) Based on Holechek s (et al., 1998) work or the best scientific information available, livestock utilization level of key perennial species in the Mojave Desert range type would not exceed 40 percent on ranges that are grazed during the dormant season and are meeting Standards. Rangelands that are grazed during the active growing season and are not meeting Standards shall not exceed 25 percent utilization of key species except as described in allotment management plans, decisions, or other management documents with a specific grazing strategy with prescribed level of perennial forage consumption. The utilization range between 25 and 40 percent is for those forage species with a proper use factor that would allow consumption up to and between 25 and 40 percent otherwise lower use limits would prevail. Until modified with current information, utilization of the following general range types as shown in Table 2-17 shall be prescribed for grazing use.

Table 2-17
Proposed Plan Grazing Guidelines for Range Types

RANGE TYPE	PERCENT OF USE OF KEY PERENNIAL SPECIES	
	POOR FAIR RANGE CONDITION OR GROWING SEASON	GOOD EXCELLENT RANGE CONDITION OR DORMANT SEASON
Mojave/Sonoran Desert Scrub	25	40
Salt Desert Shrub land	25	35
Semi desert Grass and Shrub land	30	40
Sagebrush Grassland	30	40
Mountain Shrub land	30	40
Pinyon-Juniper Woodland	30	40

Rangeland in good condition or grazed during the dormant season can withstand the higher utilization level. Rangelands in poor condition or grazed during the active growth season would receive lower utilization levels.

Monitoring of grazing allotments resource conditions would be routinely assessed to determine if Public Land Health Standards are being met. In those areas not meeting one of more Standards, monitoring processes would be established where none exist to monitor indicators of health until the Standard or resource objective has been attained. Livestock trail networks, grazed plants, livestock facilities, and animal waste are expected impacts in all grazing allotments and these ongoing impacts would be considered during analysis of the assessment and monitoring process. Activity plans for other uses or resources that overlap an allotment could have prescribed resource objectives that may further constrain grazing activities (e.g., ACEC). In an area where a Standard has not been met, the results from monitoring changes to grazing management required to meet Standards would be reviewed annually. During the final phase of the assessment process, the Range Determination includes the schedule for the next assessment of resource conditions. To attain Standards and resource objectives, the best science would be used to determine appropriate grazing management actions. Cooperative funding and assistance from other agencies, individuals, and groups would be sought to collect prescribed monitoring data for indicators of each Standard.

2.2.5.2 Cattle Grazing Outside Tortoise Habitat and the MGS Conservation Area

The following prescriptions would be implemented for all cattle allotments managed by the BLM in the planning area that are not located within either desert tortoise habitat or the Mohave Ground Squirrel Conservation Area. Affected cattle allotments include Double Mountain, Oak Creek and Round Mountain.

- (LG-2) Health assessments would be completed prior to authorizing a grazing lease or renewal of grazing lease for Double Mountain, Oak Creek, and Round Mountain.

- (LG-3) Within 12 months after completing a Health Assessment for a specific area (i.e., grazing allotment, watershed, etc.), the BLM would use field and office information to make a health determination, which would serve as baseline information to develop corrective management strategies. Where a determination indicates that standards are not being achieved, changes in grazing management would be implemented that may result in new terms and conditions to achieve standards and conform to guidelines. Although not reiterated below, this same regulatory process would be required following specified time frames given for the health assessments that follow.

The West Mojave Plan s cattle grazing program affects public lands only; it does not address the grazing of cattle on private land.

2.2.5.3 Cattle Grazing Within Tortoise Habitat and the MGS Conservation Area

The livestock grazing management prescriptions listed below would be implemented for all cattle allotments managed by the BLM in the planning area that occur in desert tortoise habitat and within the Mohave Ground Squirrel Conservation Area. Affected cattle allotments include: Cady Mountain, Cronese Lake, Darwin, Hansen Common, Harper Lake, Lacey-Cactus-McCloud, Olancha Common, Ord Mountain, Pilot Knob, Rattlesnake Canyon, Rudnick Common, Tunawee Common, and Walker Pass Common.

Unless otherwise noted, all protective measures identified in Section 2.2.5.3 would be implemented in desert tortoise habitat and the MGS Conservation Area.

2.2.5.3.1 Management under Existing Federal Biological Opinions

In June 2002, the USFWS issued a biological opinion for the CDCA Plan, entitled *Biological Opinion for the California Desert Conservation Area Plan [Desert Tortoise] (1-8-01-F-16)*. The reasonable and prudent measures set forth in the biological opinion, and terms and conditions to implement them, are applicable to the West Mojave planning area. The BLM must ensure that any permittee or lessee (hereafter referred to as lessee) complies with terms and conditions, which implement reasonable and prudent measures.

The second term and condition references the March 1994 opinion entitled, *Biological Opinion for Cattle Grazing on 25 Allotments in the Mojave Desert, Riverside and San Bernardino Counties, California (1-8-94-F-17)*. A summary of applicable terms and conditions for cattle activities are listed in Appendix O.

2.2.5.3.2 New Management Prescriptions

The following prescriptions comprise new management that would be implemented through plan adoption.

- (LG-4) The Lacey-Cactus-McCloud allotment boundary would be modified to exclude those portions that occur on China Lake NAWS.

- (LG-4a) Livestock kind and use designation in the Darwin Allotment would be converted from horse to cattle and the allotment would be incorporated within the Lacey-Cactus-McCloud Allotment.

- (LG-5) All cattle carcasses would be removed and disposed of in an appropriate manner (i.e., not buried) within two days of being found or, if this is not practicable, such reasonable time as is acceptable to the BLM authorized officer. Cross-country vehicle travel to remove cattle carcasses must have prior approval from the BLM.

- (LG-6) In all cattle allotments occurring in tortoise habitat outside of DWMAs, ephemeral authorization would only be granted when ephemeral production exceeds 230 pounds per acre. The Cady Mountain and Rudnick Common Allotments are outside DWMAs, but significant areas of high quality desert tortoise habitat are found within the allotment. Grazing use would continue until lessee voluntarily relinquishes all grazing use (see Section 2.2.5.8).

- (LG-7) New cattle guards would be designed and installed to prevent entrapment of desert tortoises. All existing cattle guards in desert tortoise habitat would be modified within three years of plan adoption to prevent entrapment of desert tortoises.

- (LG-8) Any hazards to desert tortoises that may be created, such as auger holes and trenches, would be eliminated before the rancher, contractor, or work crew leaves the site.

2.2.5.3.3 Health Assessments

(LG-9) Cady Mountain, Hansen Common, Lacey-Cactus-McCloud, Olancha Common, Rattlesnake Canyon, Rudnick Common, Tunawee Common, Walker Pass Common, and Whitewater Canyon Allotments would receive the highest priority for health assessments following adoption of the plan. Cady Mountain and Rudnick Common would be scheduled for assessment of public land health subject to a two-year review period. Allotments not relinquished after 24 months from adoption of the plan would be scheduled for public land health assessment within 18 months.

2.2.5.4 Cattle Grazing Within DWMAs

The livestock grazing management prescriptions listed below would be implemented for all cattle allotments managed by the BLM in the planning area that are located within tortoise DWMAs. Unless otherwise noted, all prescriptions identified in Sections 2.2.5.3 and 2.2.5.4 would also be implemented in DWMAs. Affected cattle allotments include Cronese Lake, Harper Lake, Ord Mountain and Pilot Knob; Valley Well allotment would not be affected.

2.2.5.4.1 Proposed Management Prescriptions

The following prescriptions comprise new management that would be implemented through plan adoption.

- (LG-10) No ephemeral authorizations would occur in DWMAs. Allotments currently capable of authorizing ephemeral and perennial forage for cattle use would be designated for perennial forage use only. Therefore, Pilot Knob Allotment would no longer be available for cattle grazing and all ephemeral production would be available for tortoise recovery and conservation. Authorizations related to grazing activities (e.g., range improvements) on the Pilot Knob Allotment would be cancelled and the allotment designation would be removed from the CDCA Plan.

- (LG-11) Issuance of temporary non-renewable (TNR) grazing permits would be prohibited in DWMAs for all lands below an elevation of 4,000 feet.

- (LG-13) When ephemeral forage production[3] is less than 230 pounds per acre, cattle would be substantially removed from portions of the allotment within the DWMA referred to as Designated Exclusion Areas (see Map 2-13) from March 15 to June 15.

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3 The *ephemeral production threshold* should not be confused with *ephemeral authorization*. The 230-pound *ephemeral production threshold* is intended to avoid competition between cattle and tortoises in years of poor rainfall and plant growth. *Ephemeral authorization* is different, in that it allows the lessee to increase the stocking rate during years when ephemeral plant growth is abundant. Whereas, ephemeral authorization would allow more cattle to be grazed (only outside DWMAs), the ephemeral production threshold would trigger the removal of cattle from Exclusion Areas (only inside DWMAs).

- (LG-14) Cattle may remain past March 15 in expectation of ephemeral forage production over 230 pounds per acre. If this level of forage is not attained when weather conditions (e.g., warming of the soil) are appropriate, cattle must be substantially removed from Designated Exclusion Areas until such time as 230 pounds per acre ephemeral forage is achieved or June 15, whichever is earlier. This determination would be made based on the evaluation and judgment of the BLM authorized officer. If cattle must be removed, the operator would be given two weeks to remove them from the designated exclusion area.

- (LG-16) The term substantially removed recognized that a few individual cattle might wander into the Designated Exclusion Areas despite the operator s best efforts and regardless of management facilities (e.g., fences, water sources) that are in place.

- (LG-17) The grazing strategy would be developed within a year and implemented within two years of plan adoption. The strategy would be a written plan detailing the area of removal, natural cattle movements, existing and potential improvements, and other constraints of cattle management.

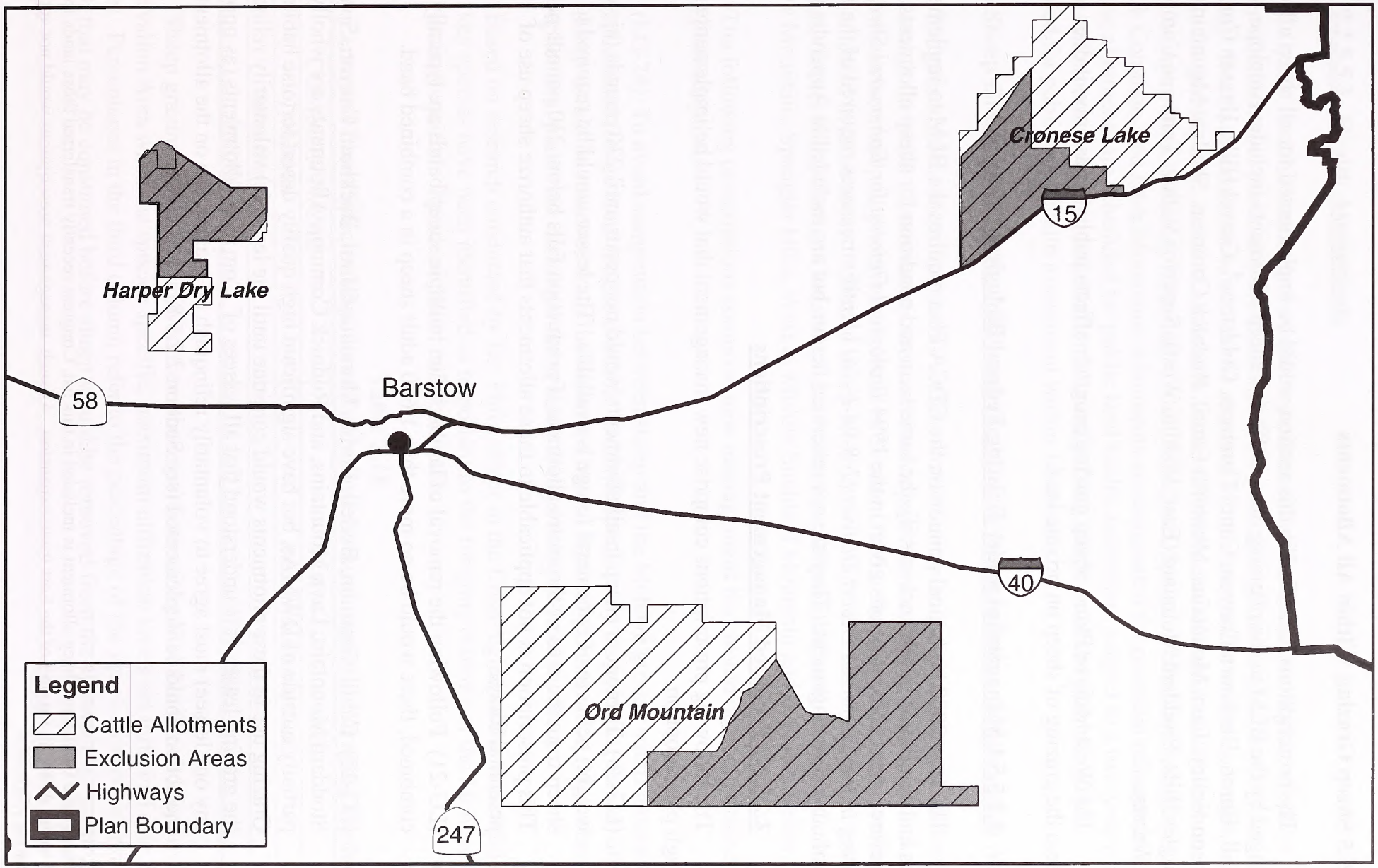
- (LG-17a) The Ord Mountain Allotment Management Plan will be revised after adoption of the West Mojave Plan. As part of the implementation of the revised AMP, based upon available funding, range fences would be installed in two places to exclude cattle from high concentration tortoise areas round adjacent to the Ord Mountain Allotment: (a) along the southern boundary of the allotment, west of the Cinnamon Hills, in northern Lucerne Valley; and (2) along the eastern boundary of the allotment, in the vicinity of Box Canyon.

2.2.5.4.2 Health Assessments

(LG-18) Cronese Lake, Harper Lake, and Ord Mountain Allotments would be scheduled for assessment of public land health subject to a two-year review period. Allotments not voluntarily relinquished after 24 months from adoption of the plan would be scheduled for public land health assessment within 18 months.

- (LG-19) Based on concerns expressed by management and grazing lessee(s), conduct a study of tortoise nutritional ecology in relation to livestock grazing, comparable to studies performed in the Ivanpah Valley during the later 1990s. If appropriate, modify grazing program in response to study findings.

Cattle Allotments with Grazing Exclusions



West Mojave Plan FEIR/S
Map 2-13

Scale: 1 : 520,000
0 10 20 Km
0 10 20 Miles

7/29/04

2.2.5.5 Sheep Grazing Within All Allotments

The prescriptions identified in this section would be implemented for all sheep allotments managed by the BLM in the planning area. Affected sheep allotments include: Antelope Valley, Bissell, Boron, Buckhorn Canyon, Cantil Common, Goldstone[4], Gravel Hills, Hansen Common, Johnson Valley, Lava Mountains, Monolith-Cantil, Rudnick Common, Shadow Mountains, Spangler Hills, Stoddard Mountain (East, Middle, West), Superior Valley, Tunawee Common, and Warren.

The West Mojave Plan s sheep grazing program affects public lands only; it does not address the grazing of sheep on private land.

2.2.5.5.1 Management under Existing Federal Biological Opinions

The June 2002 biological opinion on the CDCA Plan requires the BLM to implement terms and conditions but did not specify the same term and condition for sheep allotments. Therefore, terms and conditions given in the 1994 *Biological Opinion for Ephemeral Sheep Grazing in the California Desert District (1-8-94-F-16)* identify measures required of the BLM as part of current management. They are not reiterated herein, but are included in Appendix O.

2.2.5.5.2 Proposed Management Prescriptions

The following prescriptions comprise new management that would be implemented through plan adoption.

- (LG-20) Turnout of sheep in all allotments would not occur until 230 pounds (air-dry-weight) per acre of ephemeral forage is available. The lessee would be required to remove sheep from the area or the entire allotment if production falls below 230 pounds per acre. This prescription is not applicable to those allotments that authorize sheep use of perennial forage.

- (LG-21) Following the removal of lambs, when multiple sheep bands are typically combined, there would be no more than 1,600 adult sheep in a combined band.

- (LG-22) Cantil-Common, Bissell, Boron, Monolith-Cantil, Buckhorn Canyon, Spangler, Stoddard Mountain, Lava Mountains, and Rudnick Common Allotments are wholly or partially outside of DWMAs, but have significant high quality desert tortoise habitat. Grazing use in these allotments would continue until the lessee(s) voluntarily relinquishes the grazing lease. It is understood that all lessees of Com mon allotm ents (as opposed to any one lessee) must agree to voluntarily relinquish all grazing use on the allotment before the action could be implemented (see Section 2.2.5.8).

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4 Although the Goldstone sheep allotment is included in this list, Congress recently transferred those lands from the BLM to the Army, in support of the Fort Irwin expansion. As such, management prescriptions would not apply to the Goldstone Allotment.

2.2.5.5.3 Health Assessments

(LG-23) Health assessments would be performed within five years of plan adoption for all sheep allotments, or portions thereof, available for grazing (e.g., areas of allotments outside DWMAs). Health assessments would not be required for allotments that would no longer be available for grazing (e.g., areas of allotments inside DWMAs and relinquished allotments). Cantil Common, Bissell, Boron, Monolith-Cantil, Buckhorn, Spangler, Stoddard Mountain, Rudnick Common, and Lava Mountains Allotments are designated for potential relinquishment, and these allotments are scheduled for public land health assessment subject to a two-year review period. Allotments not relinquished after 24 months from adoption of the plan would be scheduled for public land health assessment within 18 months.

2.2.5.6 Sheep Grazing Within the MGS and the Mojave Monkeyflower Conservation Areas

The prescriptions identified in this section would be implemented on sheep allotments located within the MGS Conservation Area and the Mojave Monkeyflower Conservation Area. Unless otherwise noted, all prescriptions listed in Section 2.2.5.6 for sheep allotments would also be implemented in these areas. Affected sheep allotments include: Buckhorn Canyon, Cantil Common, Gravel Hills, Hansen Common, Lava Mountains, Monolith-Cantil, Rudnick Common, Shadow Mountain, Spangler Hills, West & Middle Stoddard Mountain and Superior Valley.

The following prescriptions comprise **new management** that would be implemented through plan adoption.

- (LG-24) To avoid competition between sheep and the Mohave ground squirrel once the ephemeral forage is no longer available and both species rely on perennial forage, all sheep would be removed from the Mohave Ground Squirrel Conservation Area when ephemeral plants are no longer the primary forage being utilized by sheep.

  Based on research conducted by Dr. Phil Leitner in the Coso region of the West Mojave, key species have been identified as important to the foraging ecology of the Mohave ground squirrel. These are listed in Table 2-18.

Table 2-18
Key Perennial Plant Species Important ToMohave Ground Squirrel Foraging Ecology

COMMON NAME	SCIENTIFIC NAME
Winterfat	*Krascheninnikovia lanata*
Spiny Hopsage	*Grayia spinosa*
Saltbush	*Atriplex* spp.

Sheep grazing would be removed from those portions of the Mohave Ground Squirrel Conservation Area when the species-specific, maximum utilization levels set forth in Table 2-19 are met. Percentages in the third column refer to the percentage of the year s current perennial growth that may be consumed before sheep would be removed from the allotment or portions thereof.

Table 2-19
Maximum Utilization Levels For Sheep Grazing In The Mohave Ground Squirrel Conservation Area

COMMON NAME	SCIENTIFIC NAME	MAXIMUM UTILIZATION LEVELS
Winterfat	*Krascheninnikovia lanata*	30%
Spiny hopsage	*Grayia spinosa*	25%
Four-winged saltbush	*Atriplex canescens*	25%
Shadscale	*Atriplex confertifolia*	25%
Allscale	*Atriplex polycarpa*	25%

To facilitate adaptive management, if future research shows that key species different from those listed above are important to the Mohave ground squirrel, those additional species would be added to the monitoring program. Similarly, if a key species identified above is not considered important to the Mohave ground squirrel in another part of its range (i.e. outside the Coso region), that species may be dropped from the list.

- (LG-25) Sheep grazing would be prohibited from the Middle Stoddard Mountain Allotment where it coincides with the Mojave monkeyflower Conservation Area. The BLM would work with the lessee to clearly identify monkeyflower habitat to be avoided.

2.2.5.7 Sheep Grazing Within DWMAs

The following prescriptions comprise **new management** that would be implemented through plan adoption. Except in two areas listed below, seep grazing would be removed from DWMAs, which would be in effect two years following plan adoption.

- (LG-26) The following allotments, found entirely within DWMAs, would no longer be available for sheep grazing: Goldstone, Gravel Hills, and Superior Valley (see Map 2-14). All ephemeral production would be available for tortoise conservation and recovery. Authorizations related to grazing activities (e.g., range improvements) would be cancelled and the allotment designation would be removed from the CDCA Plan.

- (LG-27) Boundaries would be modified in the following allotments so that areas within DWMAs would no longer be available for sheep grazing: Buckhorn Canyon, Lava Mountains, Monolith-Cantil, and East and West Stoddard Mountain. Consistent with the 1994 biological opinion, small portions of Shadow Mountains and Cantil Common Allotments would continue to be grazed (see Map 2-14) within a DWMA, however, sheep use would not occur elsewhere in the DWMA.

  Sheep grazing use would be authorized in portions of DWMAs in the Shadow Mountains and Cantil-Common Allotments under the following conditions and those conditions summarized in Appendix S:

  1. Turnout of sheep would not occur until 350 pounds (air-dry-weight) per acre of ephemeral forage is available. The lessee would be required to remove sheep from

an area of the allotment if ephemeral forage production falls below 350 pounds per acre.
2. The last day of sheep use would be June 1.
3. Watering and loading and unloading would occur at established previously disturbed sites.

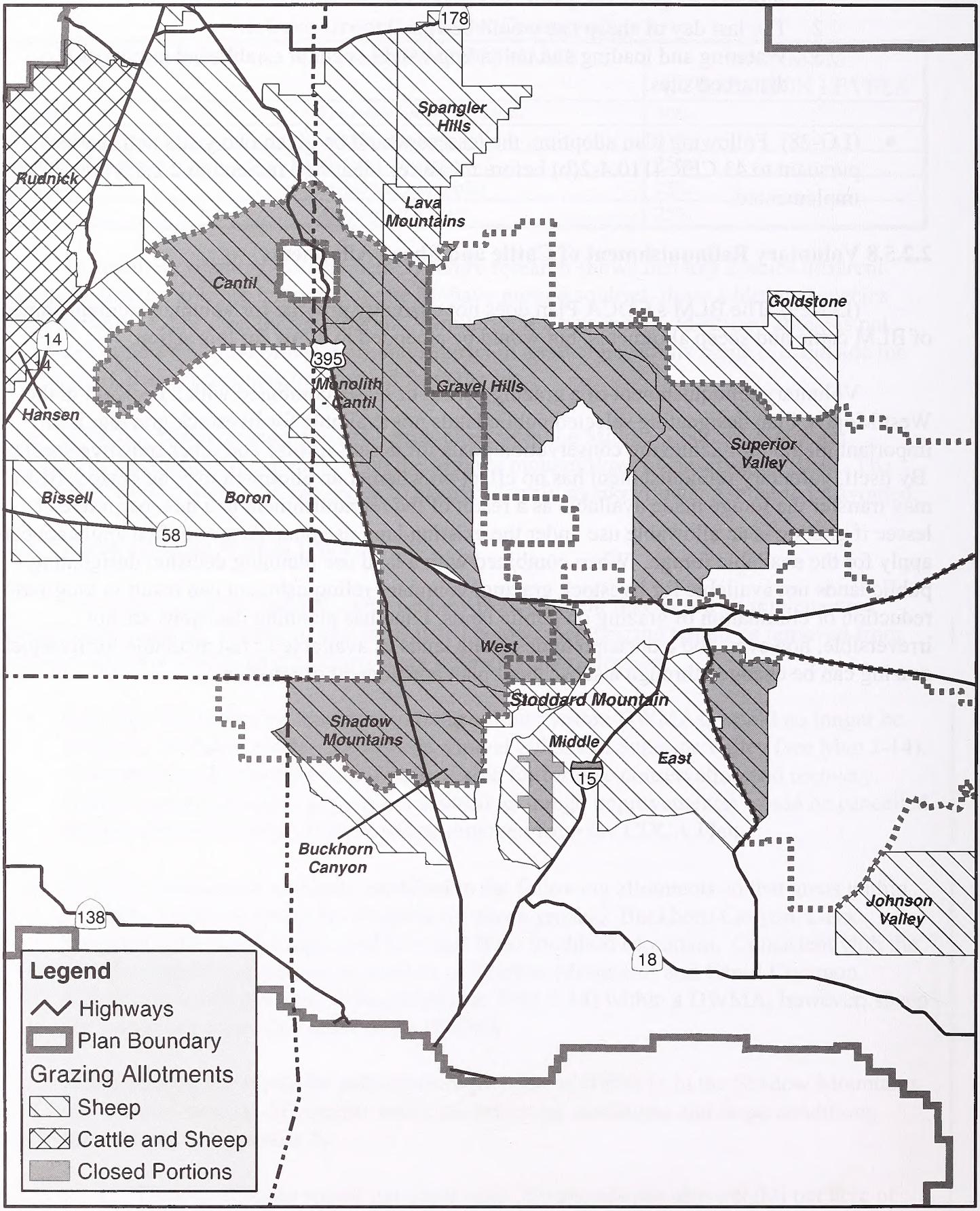
- (LG-28) Following plan adoption, the lessees would be given two years notification pursuant to 43 CFR 4110.4-2(b) before measures identified in Section 2.2.5.8 are implemented.

2.2.5.8 Voluntary Relinquishment of Cattle and Sheep Allotments

(LG-29) The BLM s CDCA Plan does not currently provide for voluntary relinquishment of BLM cattle and sheep allotments, but would be amended to allow for this action.

Voluntary relinquishment of a grazing permit or lease, combined with a decision in the West Mojave Plan designating selected public lands not available for livestock grazing, is an important method for achieving conservation goals for desert tortoise and other sensitive species. By itself, voluntary relinquishment has no effect on whether an allotment may be grazed. BLM may transfer the forage made available as a result of the relinquishment to a new permittee or lessee if grazing is an allowable use under the existing land use plan. Any qualified applicant can apply for the available forage. When combined with a land use planning decision designating public lands not available for livestock grazing, voluntary relinquishment can result in long-term reduction or elimination of grazing on public lands. Land use planning decisions are not irreversible, however, and a decision to designate lands as available or not available for livestock grazing can be changed through a subsequent plan amendment or revision.

Allotments or Portions of Sheep Allotments Not Available for Sheep Grazing



West Mojave Plan FEIR/S
Map 2-14

Scale: 1 : 800,000

0 10 20 30 Km

0 10 20 Miles

7/29/04

Upon approval of the West Mojave Plan, allotments identified for voluntary relinquishment would continue to be available for livestock grazing under the terms and conditions of the plan until: (1) a permittee or lessee submits a written request for voluntary relinquishment, (2) BLM and the permittee or lessee agree on a timeframe, and (3) BLM complies with all statutory requirements including issuance of a grazing decision in accordance with 43 CFR 4160.1 based on site-specific environmental review, consultation with affected parties, and such other procedures as may be required by statute or regulation. A grazing decision can be appealed.

BLM has been contacted by third parties who have expressed an interest in acquiring the grazing preference and permit/lease in the West Mojave planning area for purposes other than livestock grazing. Private parties may utilize a variety of financial arrangements and sale contracts to acquire ranches and transfer the associated grazing permit. BLM is not a party to these private agreements. While BLM may acknowledge an agreement in the planning process in connection with a voluntary request for relinquishment, BLM conducts its own analysis and makes its own independent decision about devoting public rangelands to a use other than livestock grazing.

BLM's decision whether to identify an allotment for voluntary relinquishment and subsequent designation of the public lands as not available for grazing is based on criteria set forth in the BLM Land Use Planning Handbook, H-1601-1, Appendix C. A separate plan amendment or revision will not be required where voluntary relinquishment is identified below as a management action for an allotment.

Grazing use would continue until the lessee voluntarily relinquishes its grazing preference and lease. Upon relinquishment, BLM would, without further analysis or notice: not reissue the lease; remove the allotment designation; assume any and all private interest in range improvements located on public land; and, designate the land within the allotment as no longer available for livestock grazing.

Voluntary relinquishment would only occur where the action would ultimately result in direct conservation benefits for special-status plant and animal species covered by the West Mojave Plan. Table 2-20 lists the grazing allotments and covered species that would benefit from this action. The BLM Handbook defines special status species as those that are listed as threatened or endangered, proposed for listing, or are candidates for listing.

Allotments identified as "Common" (e.g. Rudnick Common) are so-named because multiple lessees have grazing rights on those allotments, and several of them are identified for both cattle and sheep grazing. Lessees may request voluntary relinquishment of the portion of common allotments they are permitted to graze where use areas have been identified through an allotment management plan, or where management areas or pastures have been assigned by BLM in accordance with 43 CFR 4110.2-4. Where common allotments are not divided into use areas, voluntary relinquishment must be requested by all lessees permitted to graze the allotment.

Table 2-20
Special-Status Species That Would Benefit From
Voluntary Relinquishment of
Cattle and Sheep Allotments

CATTLE ALLOTMENT	SPECIAL-STATUS SPECIES
Cady Mountain	Desert tortoise, bighorn sheep
Cronese Lakes	Desert tortoise
Harper Lake	Desert tortoise, Mohave ground squirrel, desert cymopterus,
Ord Mountain	Desert tortoise, Mojave monkeyflower
Pilot Knob	Desert tortoise, Mohave ground squirrel, desert cymopterus
SHEEP ALLOTMENT	SPECIAL-STATUS SPECIES
Bissell	Desert tortoise, Mohave ground squirrel, alkali mariposa lily
Boron	Desert tortoise, Mohave ground squirrel, desert cymopterus
Buckhorn Canyon	Desert tortoise, Mohave ground squirrel
Cantil Common	Desert tortoise, Mohave ground squirrel, Red Rock poppy, Red Rock tarplant
Lava Mountains	Desert tortoise, Mohave ground squirrel
Monolith-Cantil	Desert tortoise, Mohave ground squirrel, Barstow woolly sunflower
Shadow Mountains	Desert tortoise, Mohave ground squirrel
Spangler Hills	Desert tortoise, Mohave ground squirrel
Stoddard Mountain, East	Desert tortoise, bighorn sheep, Mojave monkeyflower
Stoddard Mountain, Middle	Desert tortoise, Mojave monkeyflower
Stoddard Mountain, West	Desert tortoise, Mohave ground squirrel, Barstow woolly sunflower
CATTLE & SHEEP ALLOTMENT	SPECIAL-STATUS SPECIES
Rudnick Common	Desert tortoise, Mohave ground squirrel, Red Rock poppy, Red Rock tarplant, Kelso Creek monkeyflower, yellow-eared pocket mouse

2.2.6 Public Land Motorized Vehicle Access Network

2.2.6.1 Background

On June 30, 2003 The BLM issued a Decision Record that designated a network of motorized vehicle access routes in the western Mojave Desert, and amended the CDCA Plan to include the route network as a component of the CDCA Plan. This decision followed the publication, in March 2003, of an environmental assessment (EA) for the *Western Mojave Desert Off Road Vehicle Designation Project* ("Designation Project"). The Designation Project EA assessed the environmental effects of adopting the motorized vehicle access network developed

through the West Mojave planning process. Consideration of the access network in advance of the publication of the West Mojave Plan EIR/S was required to meet a court-mandated deadline for the BLM to issue a decision regarding route designation in the West Mojave plan area by June 30, 2003.

Because the motorized vehicle access network is also a component of the West Mojave Plan's conservation strategy, the analysis presented in the Designation Project EA was included in the West Mojave EIR/S. Comments regarding the network and suggested minor modifications were offered during the public review of the Draft EIR/S. This is important because the West Mojave Plan will also amend the CDCA Plan. Thus, the motorized vehicle access network that was incorporated into the CDCA Plan on June 30, 2003 could be modified by CDCA plan amendment at the time the West Mojave Plan is approved. For the Final EIR/S, Alternative A incorporates several minor network modifications that were suggested by the public during the review of the Draft EIR/S. These are described in Sections 2.2.6.7 and 2.2.6.8 (below).

Since 1980, when the CDCA Plan was adopted, BLM designated a number of motorized vehicle routes on public lands within the western Mojave Desert. The most far-reaching designation effort took place in 1985 and 1987, and encompassed most of the West Mojave planning area. Other significant route designations occurred both before and after 1985-1987 as part of various planning efforts, primarily in connection with the preparation of various ACEC plans, the Rand Mountains – Fremont Valley Management Plan and the "pilot" designation process for the Ord Mountain Planning Unit[5].

During the Designation Project, this existing network of designated motorized vehicle access routes was reviewed and, where necessary, revised prior to the second step of the process: the amendment of the CDCA Plan to incorporate the network of open and limited routes into the CDCA Plan. The following steps were taken:

- **Redesign Area -- Tortoise Critical Habitat:** Because most of the existing network was designated prior to the listing of the desert tortoise, the network was extensively revised within desert tortoise critical habitat. This involved field surveys to map existing vehicle routes, and the design of a route network that would provide motorized vehicle access, where appropriate and compatible with tortoise conservation.

- **Redesign Area -- Other Sensitive Locales:** Field inventories and the design of a route network compatible with sensitive resources were undertaken in the Middle Knob area.

- **Retention of Existing Route Network Elsewhere:** In all other areas, the existing motorized vehicle access network has been retained (excepting certain minor revisions and corrections, discussed below). These areas include the remaining portions of the 1985

5 In addition, in 2001, as stipulated by court order, BLM implemented an interim route closure within the Fremont, Kramer, Red Mountain, Newberry/Rodman and Superior subregions. These closures were to remain in effect until the issuance of a Record of Decision regarding route designation in the West Mojave, at which time they will be replaced by the route network that was adopted on June 30, 2003, together with any modifications of that network developed through the West Mojave Plan EIR/S.

and 1987 networks, the ACEC networks, the Rand Mountains – Fremont Valley Management Plan network and the Ord Mountain network.

The following discussion of the motorized vehicle access network is organized as follows:

- Criteria
- Methodology
- Take avoidance measures
- Competitive Event Corridors and Race Courses
- El Paso Collaborative Access Planning Area
- Juniper Subregion
- West Mojave EIR/S Route Network Modifications
- California Back Country Discovery Trail
- Implementation
- Modification of Route Network

2.2.6.2 Criteria

Within the redesign area, the route designation process employed successful aspects of past efforts, sought to avoid their pitfalls and involved the public extensively in its development. Consultation with the architects of past designation efforts, other land use planners and extensive conversations and meetings with the public identified a number of issues and concerns that needed to be addressed if a designation process were to be successful. As a result, it was decided to base the route designation revision on the following:

- A variety of data, including biological, cultural, and recreational resources, commercial uses and land ownership.

- Current ground-truthed maps that displayed not only route location, but also route type, use level, and recreational points of interest such as campsites and staging areas.

- A process that
  - Is standardized, repeatable and that can be logically followed.
  - Assesses each route on its own merits and issues, and documents that assessment.
  - Identifies desired future condition and implements a process to attain that condition.
  - Creates a system of routes that work together in positive synergy.
  - Systematically assesses both individually and cumulatively the effects of each route on biological, cultural and recreational resources, as well as the general access requirements of commercial and private property interests.
  - Establishes a clear link between the route designation decision and the rationale for that decision.
  - Involves the public and clearly incorporates their input.
  - Considers the history of use, public safety, the intensity and season of use and the effect of concentrating versus dispersing use.

- Takes into account the variety of recreational visitors by offering a variety of routes (e.g. 4WD vs. motorcycle).
- Considers the length of the typical visitor's stay by providing enough recreational opportunity for that stay (which would decrease route proliferation).
- Protects or maintains "feeder" and historic routes, as well as commercial and private property access.

The process would consider: (1) the level of impact of each route; (2) the number, density and intensity of use of each route and its relationship to habitat fragmentation and cumulative effects; and (3) ways to minimize the number and intensity of conflicting land uses (e.g. urban interface, noise, dust, visual impacts).

Recognizing and attempting to address the issues and concerns raised by the public represents only one, albeit very important, aspect to be considered in the development of a route designation process. A second aspect included compliance with statutory guidelines. An abbreviated summary of the primary legal requirements and their most important criteria relative to route designation is presented in Table 2-21.

A third principal aspect of a successful designation process is the inclusion of steps that ensure that the eventual system or network of routes helps significantly in achieving the desired future condition.

The final principal aspect is the inclusion of steps that carefully consider area specific planning issues and challenges, and then carefully weighs how management protocols designed to remedy those issues can best be implemented.

Table 2-21
Statutory Route Designation Criteria

STATUTE	PRINCIPAL GUIDING CRITERIA AFFECTING MOTORIZED ACCESS
FESA CESA	-Section 7 requires that the plan (i.e. "action") include steps to assist in the "recovery" of the federally threatened or endangered species.
NEPA CEQA	- Fully disclose to the public the purpose, the full range of issues and considerations (including environmental) and details of the proposed action and a reasonable range of alternatives to the public. -Carefully evaluate the cumulative effects of the proposed action. Such an analysis is to include: both the current situation, as well as the foreseeable future; evaluate both direct and indirect impacts both within the geographical borders of the action, as well as beyond and; include as part of its cumulative impact analysis not only an evaluation of biological and cultural factors, but also include an evaluation of economic and sociological factors (including recreation).
FLMPA	- Manage public lands on the basis of multiple use and sustained yield; resource values to be protected; certain lands are to be preserved in their natural condition; wild, as well as domestic habitat is to be provided for; provide for a balanced and diverse combination of recreational uses; provide for human occupancy and use; provide for economic uses (e.g. range, timber, minerals). - Comply with Section 601 provisions for the CDCA, including Congressional findings that (1) rare and endangered species of wildlife, plants and fishes and numerous archaeological and historic sites are "seriously threatened" by "pressures of increased use, particularly recreation use", and (2) BLM can and should provide present and future use and enjoyment "particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles."
National Historic Preservation Act	-Protect identified significant cultural sites; -Confer with Native American Nations on project or action (i.e. Nation to Nation conference)
Code of Federal Regulations 43 CFR 8342.1	-Trails shall be located in a manner to minimize impacts to the physical resources (i.e. soils, watershed, vegetation, air and other resources) and to prevent impairment of wilderness suitability; -trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention would be given to protect endangered or threatened species and their habitats; -trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
Taylor Grazing Act Mining Acts	-Guarantee the conditional issuance of permits allowing the use of public lands for livestock grazing and mining.
State Fish & Game Codes	-Establishes requirements protecting nesting birds of prey, particularly with respect to governing allowable levels of disturbance; -Establishes requirements protecting riparian habitat, particularly with respect to governing allowable levels of disturbance.

Landscape Factors: There are many factors that go into deciding which existing vehicle routes should be designated as open. The final designated route network needs to provide for the needs of public land users as much as possible while also minimizing potential vehicle use impacts. Routes that are retained as open are those that provide the best public access through public lands, routes that provide access to significant points of interest and those that have inherit value for recreational driving (i.e. a challenging 4-WD road through a scenic area).

The topography of the west Mojave region varies greatly from sandy bajadas to rugged rock mountains. The process of inventorying routes of travel revealed several observations that offer insight into the management of vehicle travel in the desert. Generally, it was found that

there was a higher density of routes in areas with steeper slopes and higher elevations than those without it. In flat bajada areas, routes were generally long and straight, leading from one destination to another, often from one set of hills to another. Routes traversing through hills and mountains tended to be shorter and windier. Routes in hills and mountains typically either circumnavigate the hills, wind their way to the top of the mountains for a view, or go to some destination such as a spring in a canyon, a mine, a cabin, etc. In some cases, the routes are there only to provide a challenging recreational opportunity. The mountains and hills also provide shelter; therefore, campsites were more prevalent where there was topography.

The development of the route network utilized these observations to provide access to these recreation destinations and opportunities while eliminating superfluous routes that did not add to the network by providing necessary access or opportunities.

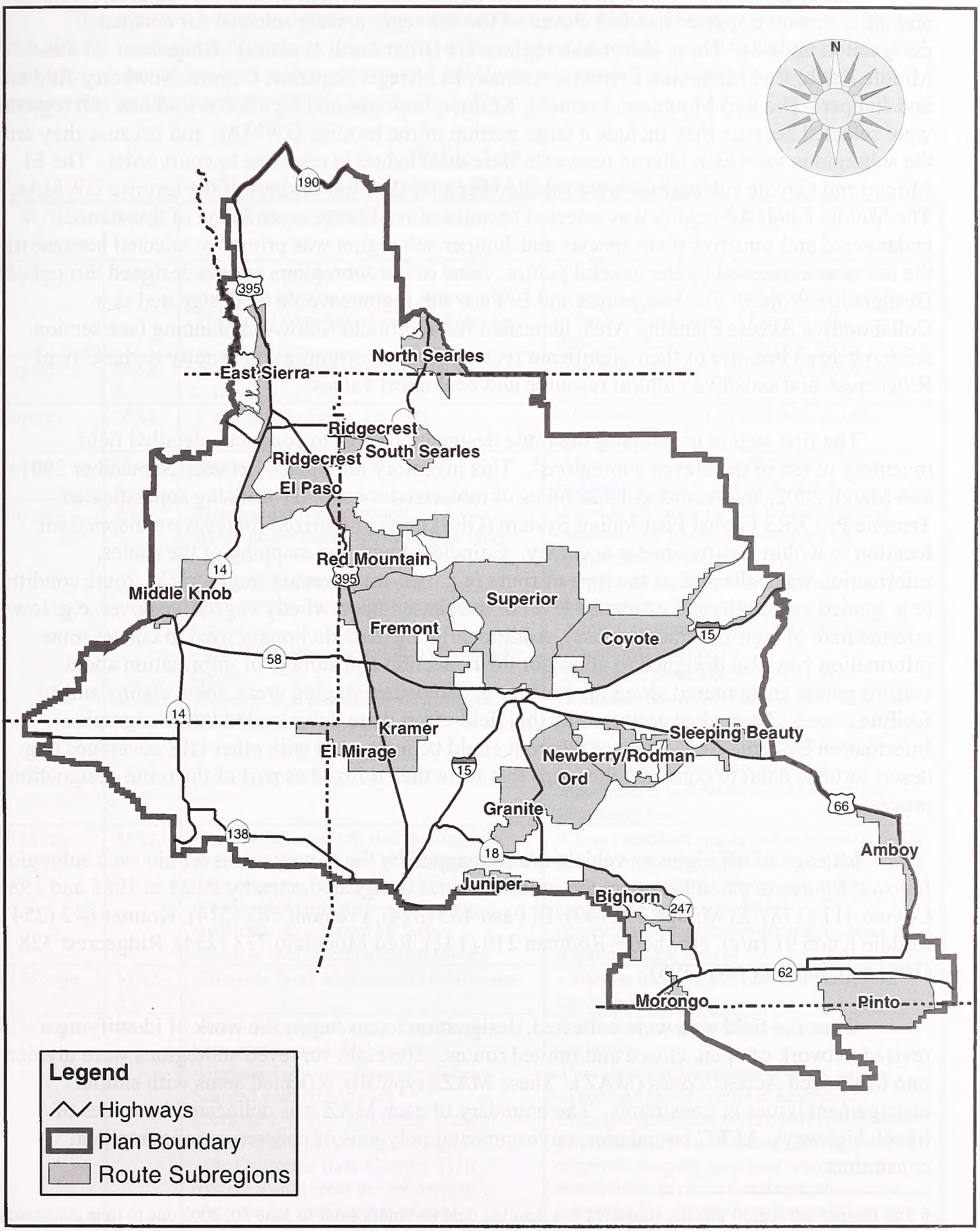
2.2.6.3 Route Designation Methodology

Given the enormity of the task of designating all motorized routes in the West Mojave planning area, the region was divided into manageable and recognizable route designation planning units. These included twenty-one "subregions," as well as the numerous ACECs for which designations have been completed, the Ord Mountain Pilot Area, and subdivisions of the remaining areas covered by the1985-87 designation effort (see Table 2-22, Map 2-14A and maps on attached compact disk). Each of the previous route designation efforts was assessed to determine its need for updating to ensure that its routes meshed smoothly with the network designated on adjacent lands.

Table 2-22
Route Designation Planning Units

SUBREGIONS	OTHER PLANNING UNITS
Amboy	Afton Canyon ACEC
Bighorn	Amboy Crater National Natural Landmark
Coyote	Barstow Woolly Sunflower ACEC
East Sierra	Bedrock Spring ACEC
El Mirage	Big Morongo Canyon ACEC
El Paso	Black Mountain ACEC
Fremont	Calico Mountain Early Man Site ACEC
Granite	Christmas Canyon ACEC
Juniper	Cronese Basin ACEC
Kramer	Desert Tortoise Research Natural Area ACEC
Middle Knob	Fossil Falls ACEC
Morongo	Great Falls Basin/Argus Range ACEC
Newberry-Rodman	Harper Dry Lake ACEC
North Searles	Jawbone/Butterbread ACEC
Ord	Juniper Flats ACEC
Pinto	Last Chance Canyon ACEC
Ridgecrest	Manix ACEC
Red Mountain	Mojave Fishhook ACEC
Sleeping Beauty	Rainbow Basin/Owl Canyon ACEC
South Searles	Red Mountain Spring (formerly Squaw Spring)
Superior	Rodman Mountains Cultural Area ACEC
	Rose Spring ACEC
	Sand Canyon ACEC
	Short Canyon ACEC
	Soggy Dry Lake ACEC
	Steam Well ACEC
	Trona Pinnacles ACEC
	Upper Johnson Valley ACEC
	Western Rand Mountains ACEC
	Whitewater Canyon ACEC
	1985-87 Inyo County
	1985-87 Cady Mountains

Route Subregions



West Mojave Plan FEIR/S
Map 2-14A

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Redesign Areas: Based upon various new and significant concerns (e.g. desert tortoise and other sensitive species habitat) eleven of the sub regions were selected for detailed designation updates. These eleven sub regions are (from north to south): Ridgecrest, El Paso, Middle Knob, Red Mountain, Fremont, Kramer, El Mirage, Superior, Coyote, Newberry-Rodman and Juniper. The Red Mountain, Fremont, Kramer, Superior and Newberry-Rodman sub regions were selected because they include a large portion of the tortoise DWMAs, and because they are the subregions for which interim networks were established in response to court order. The El Mirage and Coyote sub regions were selected because they too are part of the tortoise DWMAs. The Middle Knob sub region was selected because of its diverse assemblage of threatened, endangered and sensitive plant species and Juniper sub region was primarily selected because of the interests expressed by the general public. Nine of the subregions were redesigned through the Designation Project. The Ridgecrest and El Paso sub regions would be designated as a Collaborative Access Planning Area, identified for additional follow-on planning (see section 2.2.6.6 below) because of their significant recreational opportunities, proximity to the City of Ridgecrest, and sensitive cultural resource and ecological values.

The first step in developing the route designations was to conduct a detailed field inventory in ten of the eleven subregions[6]. This inventory took place between September 2001 and March 2002, and recorded 4,422 miles of motorized routes. By utilizing sophisticated Trimble Pro XRS Global Positioning System (GPS) units, motorized routes were mapped for location to within sub-five meter accuracy. Coincident with the mapping of the routes, information was collected on the type of route (e.g. two-track versus single-track), route condition (e.g. graded vs. rough) and estimated level of use (based upon woody vegetative cover, e.g. low-intermediate to high-intermediate use). Additionally, the data dictionary used to collect route information was also designed to allow for the collection and storage of information about various points encountered along the route (e.g. campsites, staging areas, mine claims, utility facilities, etc.). These data collected by this field effort were downloaded into Geographic Information System (GIS) database where it could be integrated with other GIS coverages (e.g. desert tortoise data) to construct the maps that were then utilized as part of the route designation process.

Mileage of off highway vehicle routes mapped by the survey teams within each subregion follows; figures in parentheses are the miles of routes designated open by BLM in 1985 and 1987: Coyote 411 (178), El Mirage 292 (49), El Paso 465 (324), Fremont 582 (214), Kramer 642 (254), Middle Knob 91 (n/a), Newberry-Rodman 210 (142), Red Mountain 733 (234), Ridgecrest 328 (106) and Superior 668 (396).

Once the field data were collected, designation teams began the work of identifying a revised network of open, closed and limited routes. The eight surveyed subregions were divided into Motorized Access Zones (MAZ). These MAZs typically reflected areas with similar management issues or constraints. The boundary of each MAZ was delineated by routes of travel, highways, ACEC boundaries, environmental polygons of concern or topographical constraints.

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6 The Juniper sub region was not subjected to a detailed field inventory prior to June 30, 2003 due to time constraints and the availability of existing route inventory data. In response to public comments, a detailed field inventory was conducted in the fall of 2003 and the network was redesigned; see Section 2.2.6.7 below.

Management issues and goals were identified for each MAZ. Whenever possible, areas with similar management goals or issues were delineated as one MAZ. Issues and goals address both the conservation of sensitive species and public access needs (including recreation, commercial and business concerns) (see Table 2-23).

Table 2-23
Motorized Access Zones (MAZ) Issues and Goals

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
Coyote	MAZ-1	-Includes a portion of Paradise Valley, an area of greater than average tortoise sign. -Dispersed commercial mining interests.	-Facilitate tortoise recovery, giving special attention to lands in Paradise Valley and lands to the west and north of Coyote Lake. -Maintain access to active mine sites.
Coyote	MAZ-2	-Recognize historical use of Manix Tank route.	-Maintain access via the Manix tank route.
Coyote	MAZ-3	-Commercial mining interests.	-Maintain access to Alvord mine & other active claims.
Coyote	MAZ-4	-Active cattle allotment.	-Allow routes for the maintenance of the ranching operation and its facilities.
Coyote	ALL	-Dispersed private property. -Many non-competitive organized OHV events. -Communication & Electrical Transmission Tower Sites throughout region. - CBDT System planned through the sub-region. -Sub region is part of Desert Tortoise DWMA.	-Provide adequate private property access. -Maintain adequate route network for continuation of special events. -Provide adequate, non-redundant access for maintenance of numerous utility sites. -Allow for connectivity of the CBDT system through this sub region. -Facilitate Desert Tortoise Recovery: Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met.
El Mirage	MAZ-1	-Shadow Mtn's south side motorcycle routes create noise and visual impacts to the community of Shadow Mtn. -Shadow Mtn private property owners conflicts with off-road MC use. -Shadow Mtn communication towers.	-Close redundant routes and particularly those that are impacting community of Shadow Mtn. - Allow recreational opportunity while minimizing land use conflicts. -Provide adequate access for maintenance of communication towers
El Mirage	MAZ-2	-Edwards Bowl Management Plan Issues	- Address issues in the Edwards Bowl Plan to the extent possible.
El Mirage	ALL	-Area of occupied private lands known to have conflict with MC use. -Dispersed private property checker-boarded with BLM lands. -Tortoise DWMA: significant areas of greater than average tortoise sign. -The California Back Country Trail System would cross the sub-region. -Provide for continuation of non-competitive organized OHV events.	-Minimize private land use/ownership conflicts. -Provide adequate private property access. - Facilitate Desert Tortoise Recovery: Eliminate redundant routes, particularly those determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
		-Dispersed private property.	opportunities in those areas with less desirable Desert Tortoise habitat. -Allow for connectivity of the CBDT system. -Allow for continuation of events where appropriate (i.e. with particular respect to Desert Tortoise concerns).
Fremont	MAZ-1	-Zone surrounds Harper Lake ACEC and abuts the southern portion of Black Mountain ACEC. -Part of Desert Tortoise DWMA: Zone is location of significant areas of historic and/or current greater than average tortoise sign. Topography is generally with slopes less than 20%, conducive to tortoises but generally not as desirable for many recreational activities. -The CBDT System is planned through the sub-region.	-Protect the intent of the ACEC and minimize creation of "volunteer" access routes into the ACEC. - Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in the more mountainous terrain found in portions of MAZs 3 and 4. - Allow for connectivity of the CBDT system.
Fremont	MAZ-2	-Includes Desert Cymopterus populations and CDFG lands set aside for its protection. -Part of Desert Tortoise DWMA: Zone is location of significant areas of historic and/or current greater than average tortoise sign. Topography generally consists of slopes of less than 20%, conducive to tortoises but generally not as desirable for many recreational activities.	-Maximize protection for desert cymopterus populations. Minimize fragmentation of its range and maximize the integrity of the CDFG lands. - Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in the more mountainous terrain found in portions of MAZs 3 and 4.
Fremont	MAZ-3	- Abuts the western boundary of the Black Mtn. ACEC. - Location of long-term popular use by campers and motorcyclists, much of which is on/around mountainous terrain (i.e. slopes greater than 20%). -The CBDT System is planned through the sub-region.	- Protect the intent of the ACEC and minimize the creation of "volunteer" access routes into the ACECs. - Minimize route redundancy, yet provide enough network connectivity to minimize the creation of "volunteer" routes. - Allow for connectivity of the CBDT.
Fremont	MAZ-4	Zone is the location (e.g. "Hamburger Mill", Gravel Hills) of long-term popular use by campers, motorcyclists, etc. much of which is on/around mountainous terrain (i.e. with slopes greater than 20%).	-Minimize redundancy while providing enough network connectivity to minimize the creation of "volunteer" routes.

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
Fremont	MAZ-5	-Part of Desert Tortoise DWMA: Zone is location of significant areas of historic and/or current greater than average tortoise sign. Topography is generally with slopes less than 20%, conducive to tortoises but generally not as desirable for many recreational activities. -The CBDT System is planned through the sub-region.	-Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in the more mountainous terrain found in portions of MAZs 3 and 4. -Allow connectivity of the CBDT system through this sub region.
Fremont	ALL	-Provide for continuation of non-competitive organized OHV events. -Part of Desert Tortoise DWMA; significant areas of historic and current greater than average tortoise sign. -Dispersed private property.	-Allow for continuation of events where appropriate (i.e. with particular respect to Desert Tortoise, Desert Cymopterus and other T,E&S concerns). - Facilitate Desert Tortoise Recovery: Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Provide adequate private property access and minimize land use conflicts.
Kramer	MAZ-1	-Route proliferation from the adjoining private lands at Silver Lakes. -Part of Desert Tortoise DWMA: Zone is location of significant areas of historic and/or current greater than average tortoise sign. Topography is generally with slopes less than 20%, conducive to tortoises but generally not as desirable for many recreational activities.	-Minimize redundancy while providing enough network connectivity to minimize the creation of "volunteer" routes. -Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat
Kramer	MAZ-2	-Rock hounding and target shooting in the Kramer Hills -Part of Desert Tortoise DWMA: Zone is location of significant areas of historic and/or current greater than average tortoise sign. -The CBDT System is planned through the sub-region.	-Allow access to historic rock-hounding areas, and consolidate and minimize the proliferation of shooting areas. -Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met -Allow for connectivity of the CBDT system.

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
Kramer	MAZ-3	-Light use relative to other zones within Kramer. Many of the existing single-track routes created by competitive events in the 1970's before most of those activities were shifted over to the Open Areas. -Location of significant areas of current greater than average tortoise sign. Topography is generally with slopes less than 20%, conducive to tortoises but generally not as desirable for many recreational activities. -The CBDT System is planned through the sub-region.	-Provide adequate private and commercial access and maintain intraregional network connectivity. -Eliminate routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat (e.g. portions of the more mountainous terrain found in MAZs 3 and 4). - Allow for connectivity of the CBDT system.
Kramer	MAZ-4	-Varied use, including dispersed camping from neighboring Hinkley into the Iron Mtns. -The CBDT System is planned through the sub-region.	-Provide varied opportunity and network connectivity particularly in those areas of rougher terrain. -Allow for connectivity of the CBDT system.
Kramer	ALL	-Part of Desert Tortoise DWMA: Zone is location of significant areas of historic and/or current greater than average tortoise sign. Topography is generally with slopes less than 20%, conducive to tortoises but generally not as desirable for many recreational activities. -Sub region is the location of permitted non-competitive organized OHV events. -Dispersed private property.	- Facilitate Desert Tortoise Recovery: Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Allow for continuation of permitted non-competitive events where appropriate. -Provide adequate private property access and minimize land use conflicts.
Middle Knob		-Pacific Crest Trail passes through area. -Area known for high biodiversity. -Location of the very rare Kern buckwheat -Dispersed private property. -Location of significant wind-farm facilities.	-Allow access to the PCT; minimize conflicts with other uses. -Minimize real or potential impacts to sensitive species. -Avoid occupied habitat of Kern buckwheat -Provide adequate private property access and minimize land use conflicts. -Provide adequate access for maintenance of facilities (including fire protection).
Newberry – Rodman	MAZ-1	-Surrounds Wilderness Area. -Location of numerous Golden Eagle and Prairie Falcon nests.	-Provide wilderness access while minimizing motorized wilderness trespass. -Minimize the impact to nesting raptors.
Newberry – Rodman	MAZ-2	-Surrounds Wilderness Area. -Subject to ranching by permitees.	-Provide wilderness access while minimizing motorized wilderness trespass. -Minimize land-use conflicts (ranching-recreation-resource protection).
Newberry – Rodman	MAZ-3	-The CBDT System is planned through this zone. -Adjoins Wilderness Area.	-Allow for connectivity of the CBDT system. -Provide wilderness access while minimizing motorized wilderness trespass.

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
Newberry - Rodman	ALL	-Part of Desert Tortoise DWMA. -Rock-hounding opportunity, sightseeing, and dispersed camping. -Dispersed commercial mines and private property.	- Facilitate Desert Tortoise Recovery: Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Allow for the diverse range of recreational opportunities, yet is protective of the resources by eliminating unnecessary and/or redundant routes. -Maintain adequate access to commercial and private properties.
Red Mountain	MAZ-1	-Location of historic popular use by miners, campers, motorcyclists, etc. -Much of this zone is mountainous terrain (i.e. with slopes greater than 20%).	-Minimize redundancy while providing enough network connectivity to minimize the creation of "volunteer" routes. -Recognize that better tortoise habitat is typically found in areas with slopes less than 20%; therefore allow for adequate recreational, commercial, private property access, yet eliminate duplicity in order to minimize impacts to physical, biological and cultural resources (43 CFR 8342.1).
Red Mountain	MAZ-2	-Substantial historic and current commercial mining activity. -Much of this zone is mountainous terrain (i.e. with slopes greater than 20%).	-Minimize redundancy while providing enough network connectivity to minimize the creation of "volunteer" routes. -Recognize that better tortoise habitat is typically found in areas with slopes less than 20%; therefore allow for adequate recreational, commercial, private property access, yet eliminate duplicity in order to minimize impacts to physical, biological and cultural resources (43 CFR 8342.1).
Red Mountain	MAZ-3	-Northwest portion of zone is location of historic popular use by miners, campers, motorcyclists, etc. -Southern portion of zone is location of historic high tortoise sign densities. -Location of Cuddeback Dry Lake, utilized by for commercial photography/filming, sight seeing, OHV recreation.	-Minimize redundancy while providing enough network connectivity to minimize the creation of "volunteer" routes. -Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Allow adequate access for commercial and recreational interests, but eliminate redundant routes in order to minimize impact to historically important tortoise habitat.

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
Red Mountain	MAZ-4	-Northeast portion of this zone is mountainous (i.e. with slopes greater than 20%). -Northeast portion of this zone has dispersed occupied private in-holdings. -Zone partially encircles Wilderness Area.	-Recognize that better tortoise habitat is typically found in areas with slopes less than 20%; therefore allow for adequate recreational, commercial, private property access, yet eliminate duplicity in order to minimize impacts to physical, biological and cultural resources (43 CFR 8342.1). -Allow adequate private property access, yet minimizes land use conflicts. -Provide access to wilderness area in a manner that minimizes motorized incursions.
Red Mountain	ALL	-Part of Desert Tortoise DWMA. -Rock-hounding opportunities, sightseeing, and dispersed camping. -Dispersed commercial mines and private property.	- Facilitate Desert Tortoise Recovery: Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Allow for the diverse range of recreational opportunities, yet is protective of the resources by eliminating unnecessary and/or redundant routes. -Maintain adequate access to commercial and private properties.
Superior	MAZ-1	-Significant illegal dumping from the local community of Barstow. -Mountainous terrain interspersed with bajadas characterized by higher than average of tortoise sign. -Illegal activities (e.g. "party spots", "meth" labs) due to proximity to urban areas. -Provides primary access to Rainbow Basin and Owl Canyon.	-Minimize illegal dumping (e.g. close short route spurs that do not serve camping, trailhead or other legitimate opportunities.) -Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Eliminate isolated loops or spurs that are not otherwise utilized for legitimate recreational or commercial use or private property access -Maintain access to these popular recreation areas (e.g. camping, equestrian, hiking, photography, geologic interpretation, etc.) in the most efficient manner possible in order to minimize habitat degradation. .

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
Superior	MAZ-2	-Zone abuts the northeastern boundary of the Black Mtn. ACEC and eastern boundary of the Black Mtn. Wilderness Area. -Location of long-term popular use (i.e. just east of the very popular Gravel Hills area in the Fremont sub region) by campers, motorcyclists, etc. much of which is on/around rough terrain (i.e. with slopes greater than 20%). -Mountainous terrain interspersed with bajadas characterized by higher than average of tortoise sign.	-Protect the intent of the ACEC (i.e. to protect its cultural resources) and the wilderness area by minimizing the likelihood of the creation of new "volunteer" routes. -Minimize redundancy while providing enough network connectivity to minimize the creation of "volunteer" routes. -Facilitate tortoise recovery. -Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat.
Superior	MAZ-3	-Some of highest densities of tortoise sign in the planning area. Topography is generally with slopes less than 20%, conducive to tortoises but generally not as desirable for many recreational activities. -Abuts the eastern boundary of the Black Mtn. ACEC and southeastern boundary of the Black Mtn. Wilderness Area. -Includes the northwest portion of the Lane Mtn Milkvetch Conservation Area.	-Eliminate routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable desert tortoise habitat. -Protect the intent of the ACEC (i.e. to protect its cultural resources) and the wilderness area by minimizing the likelihood of the creation of new "volunteer" routes. -Minimize redundancy while providing enough network connectivity to minimize the creation of "volunteer" routes. -Provide adequate commercial and private property access. Provide adequate intraregional connectivity in recreational route network in order to minimize the proliferation of "volunteer" routes. Eliminate routes that are redundant and don't meet the above criteria. -Avoid Lane Mountain milkvetch
Superior	MAZ-4	-Northern portion is occupied by Paradise Valley, an area characterized by some of the highest historic and current densities of tortoise sign in the planning area. -Southern portion is characterized by both substantial historic and current commercial mining activity.	-Eliminate routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Maintain access to active mines and patented claims.

SUB-REGION	MAZ	MANAGEMENT ISSUES	GOALS
Superior	MAZ-5	-Includes West Paradise Valley Conservation Area. -Eastern portion of this zone is occupied by Paradise Valley, an area characterized by some of the highest historic and current densities of tortoise sign in the planning area.	-Provide adequate commercial and private property access. -Provide adequate intraregional connectivity in recreational route network in order to minimize the proliferation of "volunteer" routes. -Eliminate routes that are redundant and don't meet the above criteria. -Eliminate routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable desert tortoise habitat. -Avoid Lane Mountain milkvetch
Superior	ALL	-Sub region is part of Desert Tortoise DWMA. -Sub region is known for rock-hounding opportunity, touring of old mines, sight-seeing, and dispersed camping. -Dispersed commercial mines and private property. -Includes portions of the CBDT System. -Location of permitted non-competitive organized OHV events.	- Facilitate Desert Tortoise Recovery: Eliminate redundant routes, particularly those that are determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities is determined to already be adequately met or better met by maintaining recreational opportunities in those areas with less desirable Desert Tortoise habitat. -Allow for a diverse range of recreational opportunity, yet be protective of the resources by eliminating unnecessary and/or redundant routes. -Maintain adequate access to commercial and private properties. -Allow for connectivity of the CBDT system through this sub region. -Allow for continuation of permitted non-competitive events where appropriate.

Using 1:24,000 scale maps of each MAZ, the designation team was able to make full use of background data while determining whether a given route should be opened or closed. These data included existing as well as potential environmental concerns that might constrain a route network, such as:

- T&E and sensitive species and their habitats,
- Sensitive cultural sites,
- Highly erosive soils,
- Private property (to assess access needs as well as potential land use conflicts), and
- Commercial operations (e.g. ranching, mining and utility sites).

Access needs and other land use data were also mapped, including the following:

- Route information (e.g. route type [e.g. two-track vs. single track], condition [e.g. graded, rough, technical] and use level),
- Recreation point data (e.g. campsites, staging areas, viewpoints, rock hounding areas),
- Topographical and hydrological information (seeps, washes, springs, water tanks)
- Commercial information (mining sites, claims, debris), utility lines and facilities, ranching facilities (water tanks, out buildings) and land ownership (private, state, military, BLM).

A discussion of how data were managed is presented in Appendix R, Section R.1.

Maps also indicated areas of high biological importance ("biology polygons") and areas of high human disturbance ("disturbance polygons"). The basis for these two mapped units is described below:

- **Biology Polygons:** These were created using recent field survey data gathered from the proposed tortoise DWMAs. The polygons identify areas where tortoise sign (scat, burrows, live animals) was higher than average. Within biology polygons, special emphasis was to be placed on eliminating routes determined to be unnecessary for commercial or private property access or whose contribution to recreational opportunities was adequately or better met by maintaining recreational opportunities in other areas with either less tortoise sign or habitat of lesser quality.

- **Disturbance Polygons:** These were also created from recent field survey data. The polygons indicated areas within the DWMAs where the amount vehicle-related/dependent disturbance (roads, trails or tracks; dumping; evidence of shooting) was greater than average. Route designation within these polygons was conducted with a goal of reducing vehicle-related disturbance by closing redundant or unnecessary routes. Access would be provided to private property and commercial sites, but only at a level that would meet minimum requirements. Route redundancy was also taken into account, not only for private property and commercial access needs, but also for recreational opportunity. A route was closed if its contribution to recreational opportunities was better met by maintaining recreational opportunities in other areas with either less tortoise sign or habitat of lesser quality.

The next step involved the identification of a motorized vehicle access network using a decision-tree process (see Appendix R). BLM staff and management first reviewed each sub region and MAZ. Past, present and future management concerns and issues were considered, including the effect the use of various motorized routes was having on natural resource conservation, the distribution of recreation, types of recreation, resource impacts, law enforcement issues, land use conflicts, mineral development, livestock grazing and maintenance issues. Consideration also focused on changing use patterns and trends, specific problem areas and the effect of routes on adjoining non-BLM lands (e.g. Silver Lakes, El Mirage property owners). Based upon this, the decision tree was applied.

The decision tree was applied to each of about 5,200 enumerated vehicle routes within the redesign area. For each route, the decision tree poses a series of questions, which fall sequentially into the five following categories: (1) legal easements and rights-of–way; (2) T&E species; (3) other environmental issues; (4) the special qualities of a route, including safety concerns, recreational qualities and user conflict; and (5) route redundancy. The manner in which each question is answered determines which decision tree "limb" or pathway is followed. Footnotes to the tree identify other concerns that need to be taken into consideration as each question is answered. By following a decision tree pathway, the route designator would reach a recommended designation of "Open" or "Closed." Each answer is alphanumerically coded such that the exact sequence of questions, as well as how they were answered, can be recorded for each vehicle route. These codes then enable each recommended decision to be easily entered into a database for future use and analysis. The result was a systematic, documented and repeatable framework for the evaluation of each route. Appendix R includes a table that summarizes the reasons why each of the enumerated routes that were changed from the decisions in the Designation Project was recommended as open or closed.

Redesign Mileage: Total miles of recommended open routes within the redesign area's subregions follows – Coyote 255, El Mirage 91, Fremont 372, Juniper 97 (including 24 miles designated as limited) , Kramer 362, Middle Knob 83, Newberry-Rodman 171, Red Mountain 362 and Superior 417, collectively 2,265 miles. This compares to 3,604 miles surveyed, and 1,575 miles designated open by BLM in 1985-87 (a designation based upon a survey that did not record single-track routes).

Public Lands Not Included in Redesign Area: Lands outside the redesign area were reviewed to ensure that they were compatible with the West Mojave Plan's conservation strategy and were in compliance with federal regulations (specifically, 43 CFR 8342). In some cases, minor adjustments were necessary due, in part, to the comparatively incomplete nature of the field survey conducted for the 1985-87 network, which lacked modern GPS equipment and which did record many technical 4WD and motorcycle routes. Some examples of this updating follow:

- *North Searles Sub Region:* Route designations were updated to take into consideration changing visitor use patterns. To allow loop tours of the area by day users (e.g. picnickers), some new short routes were added. The addition of these short routes is intended to minimize some route proliferation through sensitive resources that is occurring as a result of the public's effort to create looping opportunities.

- *El Mirage Sub Region:* Route designations were altered to address land use conflicts between private property owners and public recreationists on BLM lands. A few routes that were designated open as part of the Edwards Bowl Plan were closed because of the manner in which they might inadvertently direct the public onto adjoining private lands. In order to maintain the looping touring recreation opportunities provided by those closed routes, other routes that had been designated closed by the Edwards Bowl Plan were opened. The net effect of these changes should be decreased conflicts between the private property owners and the public recreating on BLM lands.

This action was carried out in accordance with 43 CFR 8342.1(3): *Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.*

- *El Mirage Sub Region:* Route designations were altered to address new information regarding desert tortoise distribution. Specifically, those routes in areas of higher than average tortoise sign that were located on bajadas and that did not provide necessary access to private property or commercial interests (e.g. active mines) or that did not serve as intra- or inter-regional connectors for recreational opportunity were designated closed. However, those non-redundant routes above the bajadas, generally on slopes greater than 20% were designated open to provide greater recreational opportunity (e.g. on the northern and eastern shoulders of the Shadow Mountain complex).
- *Black Mountain ACEC:* Route designations were altered to reflect new route information gathered during the 2001 field inventory of the adjoining Fremont and Superior sub regions. Along the mountainous western boundary of this ACEC a few routes previously designated closed were re-designated as open. These minor alterations would create a route system or "network" that would have fewer dead-ends and greater inter connectivity between routes (e.g. more looping route opportunities). This part of the Fremont sub region is a very popular recreation area with a higher probability of route proliferation and incursions into sensitive areas (in this case cultural). Past experience has shown that by providing route systems that are interesting, challenging and logical as networks, compliance level can be substantially increased. These changes should result in greater compliance in spite of the increased use that this area is experiencing.
- *Edge-matching Designation Boundaries:* At twenty-five locations, the ACEC, 1985-87 and 2002 networks bounded each other. It was necessary to adjust the location of some routes at the borders to ensure that these networks, developed at different times and based upon differing field information, would constitute a single seamless and consistent motorized vehicle access network. This effort took into account the latest information concerning recreation uses and patterns, as well as new resource concerns (e.g. recently listed T&E species).

Maps of the Proposed Off Road Vehicle Designations: Appendix R includes a compact disk on which are maps of all proposed West Mojave Off Road Vehicle Designations. The maps depict the "No Action" network (the network adopted by BLM on June 30, 2003) and the "Proposed Action" network (incorporating minor modifications made in response to public comments on the Draft West Mojave EIR/S (see sections 2.2.6.7 and 2.2.6.8, below).

Total Mileage: Alternative A recommends a route network that includes 2,265 miles of open routes within the redesign area, 159 miles within the Ord Pilot region, 406 miles within ACECs for which route networks were designated after 1980, and 2,268 miles of remaining 1985-87 designations, or 5,098 miles overall, a total that includes single-track motorcycle routes. This compares to 4,260 miles currently designated open, although that network does not include all

single-track routes (many of which were not surveyed in 1985-7) and provided little or no designations for the Middle Knob, Amboy and Ord subregions. Proposed mileage of non-motorcycle routes in higher density tortoise population areas (see Chapter 3) would be 384, a decrease from the 439 miles currently open. The 406 miles within the ACECs would be a decrease from the current 427.

2.2.6.4 Take-Avoidance Measures

During 1998 meetings between the West Mojave Team and the wildlife agencies, management prescriptions were identified to facilitate motorized vehicle access in ways that are compatible with resource protection, recovery of listed species, and conservation of species covered by incidental take permits. The intent of these prescriptions was to decrease tortoise mortality associated with dirt roads and to minimize habitat degradation. Prescriptions follow:

Open Routes: (MV-1) Routes designated open would be available for a variety of use including commercial, recreational, casual access, and non-competitive permitted uses. No motorized vehicles would be allowed to travel off of designated routes, except in emergency situations, or with the explicit permission of the BLM, or as specifically noted below.

Speed Limits: (MV-2) With respect to speed limits on unimproved roads, current law would apply. Basic Speed Law (38305) of the 2001 Vehicle Code, Traffic Laws states: "no person would drive an off-highway motor vehicle at a speed limit greater than is reasonable or prudent and in no event at a speed which endangers the safety of other persons and property.

(MV-3) In DWMAs, there is no proposal to install speed regulators. However, if monitoring or studies show that certain unimproved roads are causing increased tortoise mortality, the Implementation Team should coordinate with BLM, county road departments, and others to consider ways, including speed regulators, to reduce or avoid that mortality.

Washes: (MV-4) On public lands, motorized vehicle travel in washes would be allowed only in those washes that are designated as "open routes" and signed as appropriate.

Stopping, Parking and Camping: (MV-5) Within DWMAs, on public lands administered by the BLM, (1) Motorized-vehicle-based camping would be allowed in previously existing disturbed camping areas adjacent to motorized vehicle routes designated "open," and (2) Motorized vehicle stopping and parking would be allowed within 50 feet of the centerline of the designated route.

(MV-6) Outside DWMAs, on public lands administered by the BLM, motorized vehicle stopping, parking and camping must occur within 300 feet of vehicle routes designated as open in accordance with existing regulations, which state that "no one may operate an off-road vehicle on public lands in a manner causing, or likely to cause significant, undue damage to or disturbance of the soil, wildlife, and wildlife habitat, improvements, cultural or vegetative resources or other authorized uses of public lands." Stopping, parking and camping must be accomplished in such a manner as to curtail uncontrolled widening of routes and to deter undue degradation of sensitive or fragile resources.

Volunteer Clean-ups and Projects: (MV-7) From time to time various groups volunteer to organize and complete various projects. These projects include the removal of trash and debris on desert lands, the installation of signs, fencing, barriers, and routine maintenance activities. Each of these projects require individual project NEPA compliance documents that often limits the projects that can be completed and the efficiency of the use of these volunteers. Standard programmatic stipulations follow. They are intended to allow these activities to go forward without separate NEPA documentation.

2.2.6.5 Competitive Event Corridors and Race Courses

Johnson Valley to Parker Race Corridor: The Johnson Valley to Parker race corridor would be retained. Routes designated open would enable the Johnson Valley to Parker race to continue as a permitted organized event, including the portion of the route within the proposed Pisgah Crater ACEC. Organized events such as this race require the issuance of a "special event permit" which would allow for the event as long as certain conditions are met. These conditions may address a number of concerns, including specific stipulations from the CDCA plan, as well as law enforcement, sanitation, safety and resource protection, and any necessary minor modifications of the route. One condition for use of the Johnson Valley to Parker corridor would apply where the route borders the edge of this DWMA: events at this location would be run subject to "yellow flag" conditions.

Stoddard Valley to Johnson Valley Connector Route: The existing competitive event corridor would be deleted, and replaced by a connector route. The connector route would be located on routes designated as open. Competitive events may be held that have a split venue, with one portion of the event located in the Stoddard Valley Open Area, and the other portion of the event located in the Johnson Valley Open Area. The Stoddard to Johnson Connector Route would provide a means for competitors to travel in a limited-speed, non-competitive manner from one open area venue to the other across the Ord-Rodman tortoise DWMA. Yellow flag conditions would apply and be strictly enforced.

Barstow to Vegas Race Course: In December 2002, the Record of Decision for the BLM's Northern and Eastern Mojave Plan amended the CDCA Plan to eliminate the portion of the Barstow to Vegas course located within the NEMO planning area, that is, the eastern three-quarters of the route. Accordingly, under Alternative A, the CDCA Plan would be amended to eliminate the western fragment of the old course.

2.2.6.6 El Paso Collaborative Access Planning Area

(MV-8) The public lands within the El Paso Mountains and Ridgecrest subregions possess many unique recreational attractions, and are located immediately adjacent to the City of Ridgecrest. As a result, these two subregions are very popular with the recreating public. Opportunities to encourage the growth of eco-tourism, special OHV events and commercial filming in this area could benefit the local economy. These two subregions also possess many sensitive and important natural and cultural features, including a National Register District and habitat for the state-listed Mohave ground squirrel and other sensitive species. Finally, there are a

number of private access needs that need to be addressed, including private parcels, commercial operations (such as quarries), and permitted facilities (guzzlers, water tanks, stock ponds and communications sites). Due to all of these factors, local community interest in the nature of the motorized access to be provided is very high.

The BLM, therefore, would establish the El Paso Collaborative Access Planning Area (El Paso CAPA) for the El Paso Mountains and Ridgecrest subregions. A motorized vehicle access network would be designed for the El Paso CAPA through the collaboration of the BLM with local jurisdictions (including the City of Ridgecrest and the County of Kern) and the general public. The intent is to adopt this network as a component of the CDCA Plan by no later than December 31, 2006.

The process would be conducted subject to certain biological and cultural resource criteria that would assure that the routes to be designated as open, closed, or limited would follow the principles of species and habitat protection used in the West Mojave Plan. These "sideboards" to the process are listed below:

- Adequate protection of raptor nests, particularly golden eagle and prairie falcon;
- Adequate protection of the Red Rock poppy and Red Rock tarplant, two species endemic to the El Paso Mountains;
- Protection of riparian habitat at water sources, both natural springs and artificial water sources (guzzlers) by use of the limited designation for routes of travel, and
- Protection of riparian habitat adjoining significant roosts for Townsend's big-eared bat (if any roost sites are located).
- Full compliance with the National Historic Preservation Act, and the cultural resources element of the California Desert Conservation Area Plan.
- Protection of significant cultural resources, including those listed in the National Register of Historic Places or within the boundaries of the Last Chance Canyon National Register District and Area of Critical Environmental Concern.
- Protection of unevaluated cultural resources until their significance has been determined through formal evaluation.
- Protection of the cultural landscape within the El Paso Mountains;
- Protection of significant fossil-bearing units within the El Paso Mountains.

The West Mojave Plan's Record of Decision would amend the CDCA Plan to adopt the existing 1985-87 network for the El Paso Mountains and Ridgecrest subregions, pending the completion of the collaborative planning effort.

A timeline for completing the El Paso CAPA process follows.

- December 31, 2005: Revised motorized vehicle access network developed through the El Paso CAPA process for the El Paso Mountains and Ridgecrest subregions.
- December 31, 2006: Subsequent NEPA analysis completed and Record of Decision signed, amending CDCA Plan to adopt the network developed through the El Paso CAPA process.

2.2.6.7 Juniper Subregion

The BLM's June 30, 2003 Decision Record for the Western Mojave Desert Off Road Vehicle Designation Project adopted a 152-mile route network for the Juniper subregion, a network that replaced the existing route network designated as part of the 1985-87 route designations (see above). This network was based upon information gathered during the 1985-87 effort, subsequent collaborative work with the general public, office records and aerial photography taken in 1996. This subregion was not included in the 2001 and 2002 field inventory due to a shortage of funds.

Draft EIR/S Comments: During the public review of the Draft West Mojave Plan EIR/S, many comment letters were received on the Juniper subregion. The comments and BLM review made it apparent that the designations from the 2003 Western Mojave Desert Off-Road Vehicle Designation Project were inadequate for both resource protection and recreational experience. In some cases, unauthorized routes, such as hill climbs and routes through riparian areas were designated as open. In other instances, popular riding routes were closed.

To resolve these shortcomings, BLM commissioned a field inventory of all active routes of travel in the Juniper subregion. This inventory, comparable to the 2001 and 2002 field inventories conducted for the redesign area, provided much higher quality information on which to base route designation decisions. The inventory identified 164 miles of existing routes. Each route was mapped with Global Positioning System devices, and attributes describing the routes were assigned. Attributes included single track, rough dirt road, good dirt road, graded road, hill climbs and other features. BLM also conducted an inventory of all water sources in the subregion, in the major drainages and at many isolated seeps and springs.

Additionally, BLM initiated a comment clarification process where Draft EIR/S commentators were brought together to discuss the issues raised in their comment letters. Three meetings were held, first to introduce the clarification process and to explain the new ground-truthing effort, secondly to share the inventory results and finally to share and receive further comments on preliminary route designation recommendations.

Several commentators requested a separate planning effort for the Juniper subregion, similar to the El Paso Collaborative Access Planning Area (see Section 2.2.6.6). This request was denied for several reasons including:

- The past deferral of a Coordinated Resource Management Plan had only led to confusion, distrust and dissatisfaction with BLM planning process.
- Route designations could be addressed through the new intensive inventory and route assessment effort completed prior to release of the final EIR/S.
- Implementation of route management in the Juniper subregion would be deferred if route designation were deferred to a later date. Uncontrolled use and confusion over allowable routes of travel requires a more prompt response.
- There was no identified source of funding for a separate route designation effort for the Juniper subregion.

- After route planning is completed, the Barstow Field Office may initiate a separate activity level plan for implementation. This plan would address specific route and recreation management issues including the development of trailheads, equestrian and hiking trail networks and the specific identification of motorcycle, ATV and 4X4 routes. Signing and route maintenance would be an important component of the implementation plan.

Issues Considered During Redesign of Juniper Network: Following the completion of the field inventory, the BLM redesigned the network of motorized vehicle access routes within the Juniper subregion. The decision tree methodology (see above) was applied to the Juniper subregion, using the data collected during the fall 2003 field survey. BLM addressed a number of access and resource protection needs during this process. These included the following:

- *Livestock Grazing:* The maintained roads provide access to the private ranches. Most of the subregion is also within the boundaries of the Round Mountain grazing allotment. Safe access is required by the rancher in conjunction with his winter cattle grazing operation and access to range improvements.

- *Commercial Access:* There is a need to provide for commercial access throughout the area. A major power transmission line bisects the Juniper sub-region. Access on the accompanying utility route is important for the inspection and maintenance of the utility system and as a major thoroughfare for recreationists.

- *County Maintained Roads*: BLM recognizes that roads within the County system will be designated as open where they cross public lands. This includes Bowen Ranch Road, Juniper Flats Road and Oak Springs Road.

- *Minimum Impact Recreation:* Access is needed for recreationists participating in hiking, bird watching, photography and other such recreational pursuits. The subregion is popular with equestrians, which require access and parking sufficient for horse trailers.

- *Deep Creek Hot Springs:* Safe access is required for the trailhead to Deep Creek Hot Springs, which is visited annually by hundreds of people from throughout the United States and other countries. Access to the Deep Creek Hot Springs has been a continuing issue for both the BLM and USFS. Access from the south traditionally was provided across private lands and through the Moss Mill site. The Moss Mill site was a 17-year occupancy trespass case that was resolved in December 1999 when a court order was obtained from the US District Court, Central California District in Los Angeles. The occupants were removed, the structures destroyed, and the area rehabilitated. The road into the trespass site crossed private land for approximately 0.3 miles before entering public land. Once the trespass had been resolved, the landowner fenced the property at Bowen Ranch Road and obliterated the road that crossed his private property. Since the Moss Mill site had such a long, involved history of problems, and since the road that remained on public land had no further utility and was not consistent with management goals for the area, the road was fenced at the south end and has since overgrown.

- *US Forest Service Routes:* A network of open routes around the Bowen Ranch and Los Flores properties provides access to the US Forest Service trailhead leading to Deep Creek Hot Springs. Those routes tie into the Forest Service route designated as 3N59A from several different directions. Forest Service route 3N59A includes a parking area at the trailhead.

- *Riparian Sites:* BLM has the responsibility of protecting the important riparian sites in Arrastre Canyon, Grapevine Canyon and at several isolated springs. A number of public comments addressed this issue. Although no listed species are known to occur within the Juniper subregion, the endangered least Bell's vireo could establish nest sites in the riparian areas if its population increased sufficiently. The nearest populations are in the Mojave River flood plain in Victorville and the numbers appear to be increasing.

  BLM contracted bird surveys in Arrastre and Grapevine Canyons in 2001 (Laymon, 2001). Sixty-one species were detected in Grapevine Canyon, of which 33 were probable breeders. Lower Arrastre Canyon supported 64 species (44 probable breeders) and upper Arrastre Canyon 58 species (41 breeders). Each of these sites was important to gamebirds, especially California Quail, Mountain Quail and Mourning Dove. Neotropical migrants were fairly abundant, and some nested at these locations.

- *Terrestrial Species:* Terrestrial species covered by the West Mojave Plan include the gray vireo and the Sand Diego horned lizard. The Devil and Willow fires damaged most of the gray vireo nesting habitat (junipers and large shrubs), though it will eventually recover. The horned lizard is a vehicle-sensitive species found throughout the area, but appears to prefer the flatter terrain with fewer rock outcrops where ants are more abundant.

- *Cultural Resources:* Vehicle disturbance must also avoid the known archaeological sites within the Juniper Flats ACEC. The most significant sites may be associated with the riparian areas, such as Cottonwood Spring. This specific site is fenced to prevent livestock and OHV intrusion.

- *Motorcycle Recreation:* An additional important need of the route network is to provide for recreation opportunities for local motorcycle riders. The Juniper subregion is sandwiched between the towns of Hesperia, Apple Valley and Lucerne Valley and the San Bernardino National Forest. According to past studies by the California Department of Parks and Recreation, over 13% of Californians participate in OHV use. Preliminary results of an update of this study show an increase to 18% of Californians. Local residents rely on the subregion for a place to ride their motorcycles and to access the National Forest. BLM has designed various temporary route networks for the Juniper subregion that have not included single-track motorcycle routes. In each instance, achieving compliance with these networks was difficult. BLM worked with local motorcycle recreationists to identify a few motorcycle routes that provide a challenging and satisfying experience. An honest and open approach to understanding and accommodating the needs of these visitors has significantly increased compliance with route use.

The single-track route numbered J1299 in the June 2003 Decision Record for the Western Mojave Desert Off Road Vehicle Designation Project was the subject of many comments on the Draft West Mojave plan EIR/S. BLM has reviewed this route carefully, considering the issues of the cultural resources within the ACEC, adjacent private land, Forest access and connectivity to other routes. The decision to continue to designate this route as Open reflects all facets of the controversy and need for recreational access. Barstow Field Office staff will monitor the use of this route to insure compliance, i.e. that vehicles are not straying from the designated route.

Revised Juniper Subregion Route Network: The final recommendation designates 73 miles of routes as open for use by all motorized vehicles and 24 miles of routes as limited to the use of single-track vehicles only (e.g. motorcycles). The remaining 67 miles of inventoried routes would be closed. The intent of the single-track vehicle limitation is to ensure that these existing narrow routes are not widened by long-term four-wheel drive vehicle use while providing the recreational touring loops desired by motorcycle users. Organized competitive events would not be allowed to use these routes.

The combined total of 97 miles of open and limited routes is 29 miles less than the 126 miles of routes opened by the 85/87 route designations and is 55 miles less than the 152 miles opened by the route network adopted by BLM's June 30, 2003 Decision Record.

The revised network is depicted on Proposed Action route network maps 69, 70, 72 and 73, on the attached compact disk. The re-inventory of routes necessitated new RJ (Revised Juniper) numbers for each route while discarding the previous numbering system.

2.2.6.8 Other Route Network Modifications

In addition to the Juniper Subregion, public comments received during the review of the Draft EIR/S suggested a number of minor modifications of the route network adopted by BLM on June 30, 2003. Those suggestions have been considered and the following would be incorporated into the West Mojave motorized vehicle access network:

- **Barstow Woolly Sunflower Conservation Area:** All or portions of routes F2053, F2077 and F2079 would be closed to enhance the effectiveness of the proposed conservation strategy (one mile total).

- **Lane Mountain Milkvetch Conservation Area:** All or portions of routes SU5042, SU5048, SU5061, SU5071and SU5077 would be closed to enhance the effectiveness of the proposed conservation strategy (six miles total).

- **Pisgah Conservation Area:** All or portions of routes NR3062C and NR3064 would be closed to enhance the effectiveness of the proposed conservation strategy (three miles total).

- **Haiwee Reservoir Eastern Access:** An existing, undesignated nine-mile route providing access to the eastern side of Haiwee Reservoir would be designated as opened.

- **Competition "C" Routes:** Many commentators suggested that the Ridgecrest Field Office's network of competition, or "C" routes, be retained, as proposed by Draft EIR/S Alternative E. A portion of the "C" route network would be retained, including the majority of "C" routes located to the northeast of the Spangler Hills Open Area (approximately 20 miles). The "C" routes formerly located adjacent to the southern boundary of the Spangler Hills Open Area would not be adopted; however, about ten miles of new open routes would be provided in this area to provide touring loops and access connections. In total, about fifteen miles of new open routes would be designated and twenty miles of open routes would be designated as "C" routes.

  To offset this, approximately thirty-five miles of currently open routes within the Fremont-Kramer tortoise DWMA (Red Mountain subregion) would be closed.

  The revised network, together with "C" routes, are depicted on Proposed Action route network maps 14, 18, 19, 22, 23 and 26, on the attached compact disk.

2.2.6.9 California Back Country Discovery Trail

Certain segments of the open route network would be nominated for inclusion by the California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division (OHMVRD) as part of the California Back Country Discovery Trail (CBDT), a part of the California Statewide Motorized Trail System. The CBDT is a system of existing motorized routes that when formally designated would offer long distinct backcountry touring opportunities from Mexico to Oregon and throughout the state of California. Utilizing an OHVMRD grant, the BLM California Desert District commissioned a study that identified a proposed system of routes for inclusion as part of the CBDT. That proposed system of routes would be included as a component of the West Mojave Plan.

2.2.6.10 Implementation

(MV-9) Past experience in the West Mojave has generally shown that the most effective signing protocol (i.e. greatest public compliance) is one in which the routes designated open would be signed. Closed routes would not be signed and would either be reclaimed naturally or vertically mulched. Due to monetary and staffing constraints, as well as the remoteness of much of the West Mojave region, most of the routes designated closed would be left to natural reclamation. In those areas where environmental concerns are more profound (e.g. in areas where the amount of tortoise sign is above average or within the desert tortoise biology polygons) or where the intensity of use is such that it is necessitated, vertical mulching to the line-of-sight would be favored over natural reclamation.

Each BLM Field Office would prioritize the areas (e.g. sub regions, MAZs) and the routes to be addressed first. The range of actions and their intensity would vary based upon a number of factors (assessed need, available resources) and could include law enforcement, various forms of public education and other means, as well as signing and vertical mulching. A BLM Field Office might choose to involve the public as it prioritized these efforts and could employ options like those discussed below for monitoring route needs or prioritizing the maintenance of routes.

Discussions regarding route implementation and maintenance often prematurely place too much emphasis on route rehabilitation. Although rehabilitation has its place in the set of "tools" available to a field maintenance crew, it should only be undertaken after other route maintenance options have been exhausted. Delaying rehabilitation of routes in favor of more proactive maintenance steps is necessary if a field maintenance team is to successfully avoid the pitfalls of engaging in a program (such as rehabilitation) that can quickly become a "black hole" for scarce personnel and resources (e.g. heavy equipment, plant material). Placing premature emphasis on rehabilitation often creates its own set of new larger logistical problems, reducing if not eliminating any chance of successful implementation. Although the rehabilitation of routes would always remain an option, due to the requirements of extensive commitments of staff and resources it should not be called upon until other more proactive means of route maintenance are exhausted.

The implementation of the route system and its maintenance would begin with a first phase consisting of route management actions such as:

- Open route signing.
- Open route maintenance, with an emphasis on making the open network of routes more obvious and attractive to use than the closed routes. Existing park ranger and maintenance staff would do this during route signing and sign maintenance.
- Hand raking and disguise of prominent closed routes, including lining small rocks across closed routes to help discourage use.

Route rehabilitation work would begin only as a second phase on those routes where the first phase has not proven to be successful or where route conditions were clearly beyond the capability of the first phase to address. Although rehabilitation is recognized as a second phase, planning for this phase, including the securing of funding, should begin early. Having route designations in place would enhance the availability of funds, and would allow the BLM to pursue external sources of rehabilitation funding such as OHMVR, the National Fish and Wildlife Habitat Fund (USFWS), and contributions of volunteer labor from local, state, and national interest organizations.

Specific prioritization of work areas/sites would be guided by four factors, all of which are related to the location of the route:

- Factor 1: Are located within DWMAs,
- Factor 2: Have above-average tortoise sign (i.e. located within biology polygons),
- Factor 3: Have higher than average vehicle disturbance (i.e. located within disturbance polygons) and
- Factor 4: Have significant urban interface issues.

Examples of areas where all of these factors come into play would include portions of:

- Kramer sub region west of the community of Silver Lakes;
- El Mirage sub region east of the Edwards Bowl area and
- Superior sub region northwest of Barstow.

The highest priority would be given to areas for which all four factors apply. The second priority would be those routes characterized by factors 1-3; the third priority would be routes characterized by factors 1 and 2; fourth priority to routes characterized by factor 1 only; and fifth priority to remaining routes.

Past experience, such as that obtained through the implementation of the Ord Mountain route designation pilot, can give valuable insight into not only which actions, but in what order they should occur. Implementation of the Ord Mountain Pilot plan revealed that the most effective short-term action taken was an increase in enforcement and visitor service patrolling, which resulted in a commensurate increase in visitor contacts. Through this increased number of contacts visitors realized that BLM was aggressively and successfully implementing the new network. Visitors generally responded to this in one of two ways. Those who were not receptive to staying on designated routes gradually moved to the "Open Areas" where they could continue to recreate in a more unrestricted manner. Others continued to recreate in the Ord Mountains.

The least effective short-term action taken in the Ord Mountains was signing the closed route network. Not only did this effort consume a great deal of staff time; in addition, signs were removed almost as quickly as they were put up. The need to resign routes placed additional demands on scarce staff time and material.

Given the lessons learned from the Ord Mountain experience, the successful implementation of a new route network should proceed by carrying out these steps in the following order:

- Pursue funding for signage and the staff necessary to implement the route signing effort (i.e. both law enforcement and maintenance staff).
- Pursue funding for route rehabilitation.
- Sign the open route network (do not sign the closed route network).
- Maintain the open route network with the principal goal being to make the open route network more attractive for use than the closed route network. Make ample use of the tools such as the York Rock Rake to shape, clear and contour the open route network.
- Install informational kiosks and interpretive signing where it would be most effective. Site these facilities where it would reach the greatest number of visitors and where it would target an audience that might be the most receptive to such facilities. For example, in the Kramer sub region such facilities might be most beneficial at major trailheads and campgrounds in the eastern portion of the sub region that are heavily visited by families enjoying camping.
- Develop and publish maps that are up-to-date, readily available and have a readily understandable and useful format. For example, many visitors are familiar with the informational format employed by USGS quadrangle sheets. The Friends of Jawbone have published a map which has proven very popular amongst users to that region and that might serve as a good "for purchase" template. The Off-Highway Motor Vehicle Recreation Division of California State Parks has produced a series of inexpensive pocket maps for each of its facilities that may serve as a good template for very inexpensive or free maps.
- Regularly maintain signs, kiosks, routes, maps and brochures.

At this point in the new route implementation process, if no new funding for law enforcement has been forthcoming, then all that can be done to obtain voluntary compliance has already taken place. Voluntary compliance would be slow in the beginning, but would increase over time (within the next 2 – 10 years).

At such time as additional funds are available for law enforcement and rehabilitation, the following steps should be taken:

- Begin route rehabilitation in priority areas.
  - Route rehabilitation would require active maintenance for at least 1 year.
- Initiate enforcement and visitor service patrols with the following caveats:
  - Do not over-commit; funding must be available to sustain the new patrol for a period of at least 2 years.
  - As enforcement efforts move into new areas, inappropriate use could migrate back to areas where the program had already been implemented. Address this by allocating more funding to new areas, as there would still be a residual cost to maintain the first (earlier implemented) area.
  - Keep in mind that it typically takes one year from the date funding becomes available until the time that a new fully delegated ranger is deployed into the field.
  - Consider that turnover amongst law enforcement staff is high, which will reduce the efficiency of enforcement efforts both due to vacancies and the need for new training.

Table 2-24 presents an implementation time frame. Table 2-25 lays out the cost of implementation actions.

Table 2-24
Implementation Time Frames

ACTION	COMPLETION TIME	COMMENTS
Pursue funding and FTE for enforcement, visitor services, and maintenance.	Year 3 - Ongoing	BLM works on a three-year budget cycle. There may be some infusion earlier.
Pursue funding for route rehabilitation.	Year 2 - Ongoing	This would likely come from both federal appropriations and external sources. Someone should be given this as a task.
Sign open route network.	Year 1- Ongoing	Assumes funding in year 1
Maintain open route network.	Year 1- Ongoing	Assumes funding in year 1
Install informational kiosks and interpretive signing.	Year 1- Ongoing	Assumes funding in year 1
Develop and publish maps and brochures.	Year 1- Ongoing	Assumes funding in year 1
Routinely maintain signs, kiosks, routes, maps, and brochures.	Year 2- Ongoing	Assumes ongoing funding

Table 2-25
Implementation Costs

ACTION	COST	PRIORITY
Pursue funding and FTEs for enforcement, visitor services, and maintenance.	$100,000 annually per Law Enforcement Officer w/vehicle X 5 $75,000 annually per Visitor Service Staffer w/Vehicle X 5 $75,000 annually per Maintenance Staffter. w/ Vehicle X 5 Total Annual funding needed: $1,2500,000	1
Pursue funding for route rehabilitation.	$100,000 annually	1
Sign open route network.	$10,000 one time cost	2
Maintain open route network.	Included in staff cost	2
Install informational kiosks and interpretive signing.	$50,000 one time cost	1
Develop and publish maps and brochures.	$20,000 one time cost	2
Routinely maintain signs, kiosks, routes, maps, and brochures.	$30,000 annually	2

2.2.6.11 Modification of Route Network

The West Mojave Record of Decision would amend the CDCA Plan to adopt the motorized vehicle access network as a component of that Plan. Any significant future modifications of the network, therefore, could only occur through an amendment to the CDCA Plan, including full NEPA compliance, public involvement, interagency coordination, and the preparation of a Record of Decision for the amendment.

Minor modifications of the network during plan implementation would be allowed, however, without the necessity of a formal plan amendment. FLPMA allows BLM resource management plans (such as the CDCA Plan) to be "maintained as necessary to reflect minor changes in data" (Section 1610.5-4.) Plan maintenance is limited, in that it cannot result in the expansion of the scope of resource uses or restrictions, or change the terms, conditions and decisions of the approved plan. It is limited to further refining or documenting a previously approved decision incorporated in the plan. In view of these limitations, "minor realignments" of the route network would be considered to be plan maintenance, and could be made without formal amendment of the plan. "Minor realignments" would include the following:

- Minor realignments of a route necessary to avoid cultural resources sites identified during the process of complying with Section 106 of the National Historic Preservation Act.
- Minor realignments of a route necessary to reduce impact on sensitive species or their habitats.
- Minor realignments of a route that would substantially increase the quality of a recreational experience, but that would not affect sensitive species or their habitat, or any other sensitive resource value.
- Opening or limited opening of routes where valid rights of way or easements of record were not accurately identified in the route designation process.
- Access to private inholdings, if such access could not be provided administratively.

Minor realignments could include the opening of an existing, but previously closed, route that serves the same access need as the open route that is to be "realigned." It does not include the construction of a new access route involving new ground disturbance, except where new construction is necessary to avoid a cultural resource site or sensitive species.

Minor realignments must be documented in the official record. The reason for the alignment change shall be recorded and kept on file in the affected BLM Field Office, and the change noted in the CDCA Plan.

Route designation on newly acquired lands would occur every five years (or sooner, if judged to be prudent by the Implementation Team), would comply with applicable federal regulations and statutes, and be incorporated into the overall route implementation process. New route networks on acquired lands would be required to facilitate conservation programs and be complimentary to the network resulting from alternative implementation

2.2.7 Education Program

The West Mojave Plan cannot be successfully implemented without the cooperation and support of the general public, desert stakeholders and others with an interest in the western Mojave Desert. This requires an understanding of both the conservation strategy and the resource needs of the desert.

2.2.7.1 Goals

An education program designed to accomplish this should be guided by the following program goals:

Goal 1: Increase public awareness, appreciation and knowledge of

- Desert ecology, sensitive species, and the need to preserve habitat and protect the desert environment
- Agency activities, laws and regulations (government and private conservation groups)
- Desert etiquette (minimizing deleterious effects on the desert environment)

- **Goal 2:** Increase public support for and participation in activities that benefit the desert ecosystem. Focus on opportunities rather than restrictions.

Goal 3: Support schools in educational efforts related to desert topics

Goal 4: Encourage scientific study of desert species and ecosystems

- Facilitate publication of information on desert species and environment
- Assist in building a repository of information on the Mojave Desert (books, journal articles, reports, bibliographies, photos)

2.2.7.2 Targets

The education program should be designed to reach a broad range of desert users. The following is a representative, but not an exclusive, list of groups to be targeted: (1) the general public; (2) schools; (3) special interest groups (off-highway vehicle recreationists, equestrians, hunters, campers, hikers, rockhounds, historical societies, biologists); (4) government agencies; and (5) development and commercial interests (construction firms, miners, film makers and the military).

2.2.7.3 Delivery

Utilize television, radio, and Internet web sites.

Distribute information and education materials

- Through schools, museums, private contractors and organizations
- At recreation vehicle shows, off highway vehicle events (e.g., dual sport), and dealer associations (Harley-Davidson, Honda, Suzuki, etc.).
- At convenience stores and other walk-in commercial interests. Consider using restaurant place settings and napkins as part of public outreach.
- Through existing portals, such as Friends of El Mirage and Friends of Jawbone.
- At the Planning Departments of each participating jurisdiction.
- At Resource Conservation Districts.
- At other non-profit environmental education centers (e.g. Wildlands Conservancy in Pioneertown, Summertree Institute in Morongo Valley.
- At BLM ACEC's such as Harper Dry Lake, Big Morongo Canyon, and Desert Tortoise Natural Area.

Finally, consider targeting users through green-sticker money, by distributing materials at the time the sticker is purchased through Division of Motor Vehicles.

2.2.7.4 Means

Education Coordinator: (E-1) A coordinator of educational programs should be identified. The education coordinator should work closely with the Implementation Team and/or appropriate regulatory agencies to approve the final education program, judge its efficacy, and ensure appropriate implementation.

(E-2) The first effort of the education coordinator should be to determine environmental education programs that already exist, and to determine gaps in the program. The coordinator should produce and implement the program to, in part, fill in these gaps. The education coordinator should take into consideration the experiences of successful desert education programs, such as the Sand Canyon Environmental Education Program, and the Hands Off Pardner program.

(E-3) The education coordinator should work with non-government organizations with an interest in the western Mojave Desert to better reach group members. The coordinator should work with off-highway vehicle groups to help fund existing programs and create new ones as needed to increase sensitivity to desert ecology.

(E-4) In drawing up a single, programmatic education program to be given to construction workers, the coordinator should review files maintained by the USFWS and CDFG to see the range of education materials that have been used since the listing of the tortoise, for example. Between 1990 and 1995, for example, such an approach resulted in rescuing 1,455 tortoises out of harm's way during construction of 171 federally-authorized projects in tortoise-occupied habitats (LaRue and Dougherty 1997-1998).

It is important that anyone designing and implementing an education program work with law enforcement personnel (including BLM, county animal control, USFWS enforcement agents and CDFG rangers) to identify problems and develop solutions.

School Education: (E-5) Develop displays, programs, and materials that can be provided to school districts in the West Mojave planning area. Fund and/or cooperate with existing programs (San Bernardino County Museum ecological study kits, etc.) to provide for enhanced outreach to schools in desert communities.

Schools should be targeted at the district level. Although schools in the western Mojave Desert area should be targeted first, it is important to reach the larger area, including the Inland Empire and Los Angeles County school districts.

Other Public Institutions: (E-6) Provide support to the efforts of museums, zoos, and other public institutions to develop pertinent desert tortoise exhibits, including:

- The San Bernardino County Museum's program to develop a desert tortoise exhibit.
- The Mojave Narrows Regional Park's development of an outdoor interpretive program involving a live-tortoise exhibit.
- Ongoing environmental education at the Lewis Center, other programs supported by Edwards Air Force Base, the BLM's community outreach program, etc.

Information Products: (E-7) The education program should include the preparation, distribution and/or installation of signs, interpretive kiosks, displays, maps, videos, education packets and brochures. Each of these is discussed below.

Proper *signing* on the ground is essential. A signing program should include the following:

- Strategically place an appropriate number of signs between the Stoddard Valley and Johnson Valley off highway vehicle open areas and the adjacent Ord-Rodman DWMA.
- Erect signs along DWMA boundaries. The Implementation Team, together with the education coordinator, should ensure that boundary signs are appropriately worded and spaced to maximize their usefulness.
- Design and erect a new sign at the Desert Tortoise Natural Area; include in the sign appropriate behavior messages and offer an □800" telephone number for information on tortoise adoption.
- Place information *kiosks* in pertinent parts of the desert.
- Work with Caltrans to design and install separate, freestanding, interpretive kiosks with desert tortoise protection information at highway rest areas.
- Target off highway vehicle use areas, such as El Mirage and Jawbone; distribute materials through volunteer groups associated with those areas.

Portable *displays* should be developed and produced, including a portable desert tortoise exhibit, for use at county fairs, shows, agency offices, shopping malls, museums, and the BLM's California Desert Information Center in Barstow. User-friendly *maps* should be prepared which show approved routes of travel. Work with university, media and corporate sponsor(s) to develop a quality *video* on desert tortoises for release to network, local, and cable television stations. Develop educational *packets* for use in classrooms. Produce a *brochure* to be distributed by jurisdictions that outlines the farmer's responsibilities under the endangered species act when developing habitat for target species. Produce a *brochure* to be distributed by jurisdictions describing the burrowing owl and its habitat features in urban areas.

Training: (E-8) As with the Desert Tortoise Council workshops, annual training for consultants and others working at construction sites should be provided to ensure that they have a foundation in training for monitoring.

(E-9) In addition, education programs should be provided, on a case-by-case basis, to train utility and Caltrans maintenance staff, personnel at mines, government employees, and others to conduct tortoise rescue actions at isolated sites.

Telephone Hotline: (E-10) Develop a telephone hotline, similar to the hotline program being implemented for the Clark County, Nevada desert tortoise program. The hotline

- Should provide information regarding pet adoption, not releasing pet tortoises, what to do if a tortoise wanders into your yard, regulations, and plan-based support information.

- Should also target construction personnel working in non-survey areas so that they may call in the event they find a tortoise in harm's way. Information should be available about the burrowing owl.

- Should not require a toll call.

Specific Information Needs: (E-11) Develop specific outreach plans for the following purposes:

- To maximize the effectiveness of fences that may be constructed along the interface between urbanizing communities and the HCA.

- To discourage poaching. In particular, target any communities that may practice tortoise collection for ceremonial or other purposes.

- To reduce raven - tortoise conflicts. The purpose would be to reduce the number of citizens who purposely feed ravens or who inadvertently do so by leaving pet food out where ravens can easily access it. These educational efforts should include, but not be limited to, business and agriculture.

(E-12) Develop local television outreach that talks about the plight of the tortoise and implementation of the West Mojave Plan. Several focal issues include discouraging release of pet tortoises, educating people about not poaching a Threatened species, and minimizing release of free-roaming dogs.

2.2.8 Monitoring and Adaptive Management

The success of the West Mojave Plan's conservation strategy would depend, to a great degree, on the ability of the participating agencies to ensure that its measures are being properly implemented, that its strategies are effective and that the plan is flexible enough to adapt to changing conditions and circumstances. This requires the establishment of a program to monitor the progress of plan implementation and success at attaining the biological goals and objectives of the plan.

(M-1) The West Mojave Implementation Team would maintain a database of survey reports and new records of occurrence of all species addressed by the Plan in cooperation with CDFG's Natural Diversity Data Base. Botanical surveys would conform to the CDFG *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities* (CDFG, 2000).

(M-2) It would also keep records of newly permitted activities issued within the conservation areas. Annual reports would record the amount of incidental take permitted and the conservation achieved for each species, whether by acquisition or by increased management.

(P-1a) The Plan would establish reference sites within Conservation Areas where populations of conserved species would be monitored on a periodic basis. Rare plant species would be monitored following wet years. The variability in abundance of annual plants makes the baseline for these species difficult to determine, and the reference population monitoring will assist in defining the baseline numbers and extent of occupied habitat, as well as assessing the success of conservation.

Adaptive management is an integrated method for addressing uncertainty in natural resource management. It is a structured process for learning by doing, examining strategies for meeting measurable biological goals and objectives, and then, if necessary, adjusting future conservation management actions according to what is learned. An adaptive management program is essential for species with information gaps and biological uncertainty involving a potentially significant risk to the species. Therefore, Alternative A proposes an adaptive management strategy that is intended to (1) establish a monitoring program that is able to detect the necessary information for strategy evaluation; and (2) incorporate feedback loops that link implementation and monitoring to appropriate changes in management.

Specific monitoring and adaptive management actions proposed for each species are given in Table 2-26. Because these actions are designed to enhance the ability of the conservation strategy to meet each species' biological goals and objectives, the latter are also listed in Table 2-26.

Table 2-26
Monitoring and Adaptive Management Program

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
Alkali mariposa lily	Goal 1. Maintain the hydrological processes that support alkali mariposa lily at the Rosamond Lake Basin and outlying seeps, meadows and springs. Goal 2. Conserve and maintain the hydrological processes at outlying sites representative of alkali spring, meadow, and seep habitats. Goal 3. Identify additional springs, meadows, seeps, and playas supporting rare alkali plants.	Objective 1: Conserve a contiguous area of playa edge habitat on private lands adjacent to EAFB. Objective 2: Acquire Rabbit Springs and Paradise Springs (including water rights) through willing seller purchase or exchange. Objective 3: Conserve additional springs with occupied habitat as Conservation Area or ACEC. Objective 4: Maintain integrity of Amargosa creek to the extent feasible	Measure groundwater levels at existing nearby wells inside or within one mile of the Alkali Mariposa lily conservation area. If no wells exist in close proximity, the surface water level may be measured. (#2) (M-3) Conduct presence absence surveys at other alkaline springs, seeps, and playas within one year of plan adoption. (#1) Determine plant numbers and area of occupied habitat at new sites identified since plan adoption every five years. (#3) Monitor population numbers and measure groundwater levels in Conservation Area adjacent to LA County treatment ponds. (#1)	(AM-1) If surveys show substantial occurrences at isolated sites then the Implementing Authority will provide additional protection, which could include: acquisition, fencing or conservation area boundary modification. If population numbers are dependent upon groundwater levels at LA County treatment ponds, then acquire water rights to maintain groundwater levels.
Barstow woolly sunflower	Goal 1: Protect a contiguous habitat block with conserved populations on public lands throughout the species range Goal 2: Establish an additional reserve through adaptive management in the western part of the range. Goal 3: Manage the remaining outlying populations by site-specific measures.	Objective 1: Consolidate BLM and CDFG lands northeast of Kramer Junction to form a core reserve. The core reserve will be an expanded BLM ACEC and CDFG ecological reserve. Objective 2: Acquire private lands containing known occurrences within the core reserve. Objective 3: Establish a survey requirement area north of EAFB and northwest of Kramer Junction to identify reserve boundaries Objective 4: Require avoidance on a project basis.	BLM and CDFG will monitor OHV disturbance off designated open routes within the ACEC and Ecological Reserve area. (#2) Establish baseline population numbers and occupied acreage in conservation areas. (#2)	(AM-3) If new populations are identified through new survey information then adjust boundaries of Kramer and North Edwards Conservation areas to include those populations. . If adverse impacts to species are detected then revise road network or install fencing based on disturbance surveys within ACEC and Ecological Reserve Area. Adjust boundaries of Coolgardie Mesa Conservation Area based on new occurrences if appropriate.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
Bat: California leaf-nosed bat	Goal 1: Maintain and enhance viability of all bat populations in the planning area, regardless of species.	Objective 1: Install bat-accessible gates at the entrance of all significant roosts. Objective 2: Protect foraging habitat for California leaf-nosed bat. Objective 3: Adopt uniform survey requirements and mitigation measures. Objective 4: Establish baseline population numbers.	(M-6) Determine bat numbers in all significant roosts, using CDFG approved methods.(#3) (M-7) Approved projects that impact bats under the take limit would be reported annually to the CDFG and the USFWS. (Ongoing) (M-8) Conduct periodic surveys of mine openings in Pinto Mountains for Leaf-nosed bats in areas with high potential for containing significant roosts. (#2) (M-9) Effectiveness of mitigation measures providing for safe exit of bats should be reported. (Ongoing) Monitor population numbers using bat houses if installed. (#1)	(AM-5) If new significant roosts are found then gate mine. (AM-6) If populations decline or are threatened then install bat houses in locations where appropriate. (AM-7) If newly-detected significant roosts for California leaf-nosed bats are near open routes then provide case-by-case review of open routes within riparian and desert wash habitat. If the new roosts are impacted by open routes then take corrective action within the foraging habitat or establish a new route avoiding the habitat.
Bat: Townsend's big-eared bat	Goal 1: Maintain and enhance viability of all bat populations in the planning area, regardless of species.	Objective 1: Install bat-accessible gates at the entrance of all significant roosts. Objective 2: Protect foraging habitat for Townsend's big-eared bat and California leaf-nosed bat. Objective 3: Adopt uniform survey requirements and mitigation measures. Objective 4: Establish baseline population numbers.	(M-6) Determine bat numbers in all significant roosts, using CDFG approved methods.(#3) (M-8) Conduct periodic surveys in the northern part of planning area with high potential for containing significant roosts. (#2) (M-9) Effectiveness of mitigation measures providing for safe exit of bats should be reported. (Ongoing) (M-7) Approved projects that impact bats under the take limit would be reported annually to the CDFG and the USFWS. (Ongoing) Monitor population numbers using bat houses if installed. (#1).	(AM-5) If new significant roosts are found then gate mine. (AM-6) If populations decline or are threatened then install bat houses in locations where appropriate. (AM-7) If newly-detected significant roosts for Townsend's big-eared bat are near open routes then provide case-by-case review of open routes within riparian and desert wash habitat. If the new roosts are impacted by open routes then take corrective action within the foraging habitat or establish a new route avoiding the habitat.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
Bendire's thrasher	Goal 1: Protect *and enhance* known populations and habitat on public land.	Objective 1: Establish four Bendire's thrasher conservation areas. Objective 2: Establish baseline numbers for all portions of the Conservation Areas.	Monitor periodically population numbers and habitat disturbance in conservation areas. (#2)	(AM-8) If new populations are discovered then adjust conservation area boundaries. If surveys show presence of significant numbers of birds and undisturbed habitat, then consider addition of a conservation area near Yucca Valley
Brown-crested flycatcher	Goal 1: Conserve *and enhance* all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Eradicate invasive riparian plants in suitable nesting habitat.	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon and in Mojave River to determine number of nesting pairs. (#1) (LG-9) BLM will conduct a regional rangeland health assessment of the riparian area in the east Sierra Canyons within two years of Plan approval. (#1) Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use. . (AM-13) If rangeland health assessments in riparian areas of the east Sierra canyons do not meet Proper Functioning Conditions, then adjust grazing practices or eradicate invasive riparian plants. (AM-14) If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.
Burrowing owl	Goal 1. Prevent direct incidental take. Goal 2. Protect and enhance known populations and habitat on public land	Objective 1: Provide educational program for jurisdictions. Objective 2: Evaluate the feasibility of establishing grassland preserves. .	Complete baseline inventory of conserved habitat within two years (#1) (M-15) Compile annually record of take and conservation by acquisition and relocation. (Ongoing) (M-16) Survey sites in Antelope Valley and along Mojave River (#3).	(AM-15) If new owl nesting sites are discovered, then designate new conservation areas or adjust acquisition priorities. If preserve establishment is feasible, adaptive management will be engaged to protect and manage the habitat If research shows that active translocation is successful, then utilize this method to establish colonies in protected areas.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
Cushenbury buckwheat, Cushenbury milkvetch, Cushenbury oxytheca, Parish's daisy, Shockley's rockcress	Goal 1: Conserve two major unfragmented populations on BLM lands contiguous with populations on Forest Service lands. Goal 2: Protect outlying populations of parish's daisy from grazing.	Objective 1: Establish an ACEC where management is focused on protection of the carbonate endemic plants. Objective 2: Acquire fee title or conservation easements on private land within the ACEC. Objective 3: Adaptively manage populations on reclaimed mine sites.	(M-18) Monitor disturbance within ACEC. (#2) Report new populations of Parish's daisy within grazing allotments. (Ongoing) Evaluate revegetation and restoration of mined properties. (#2)	(AM-16) If the revegetation and restoration of mined properties is not successful, then adjust revegetation, per Carbonate Management strategy (AM-17) If specific occurrences of Parish's daisy need to be protected from grazing, then fence. If monitoring reveals OHV disturbance then sign and gate access routes.
Charlotte's phacelia	Goal 1: Maintain and enhance existing occurrences and habitat.		(M-19) Monitor populations in the Short Canyon and Sand Canyon ACEC's and at Red Rock Canyon State Park. (#2) Monitor disturbance to occupied habitat in El Paso Mountains. (#1) (LG-9) BLM will conduct a regional rangeland health assessment of the area in the east Sierra Canyons within two years of Plan approval. (#1)	(AM-18) If monitoring shows damage from OHV use in the El Paso Mountains and elsewhere fence occurrences as necessary. (AM-13) If rangeland health assessments in the east Sierra canyons do not meet requirements, then adjust grazing practices.
Crucifixion thorn	Goal 1: Preserve disjunct populations on public land and protect the crucifixion thorn woodland community.		(M-21) Record and report new locations to NDDB and San Bernardino County. (Ongoing)	(AM-20) If new locations of occupied habitat are found, then review route designation and prohibit firewood cutting. (AM-21) If monitoring of "woodland" site indicates damage, then construct fencing at strategic locations.
Desert cymopterus	Goal 1: Establish a conservation area containing known occurrences. Goal 2: Protect all known populations from disturbance, including grazing.	Objective 1: Identify potential and suitable habitat. Objective 2: Conduct surveys within potential and suitable habitat to establish baseline population numbers and acreage of occupied habitat.	(LG-18) Assess rangeland health on Harper Lake allotment. (#1) Monitor population numbers in occupied habitat every three years. (ongoing)	If rangeland health assessments indicate that more than half desert cymopturus flowering stalks are consumed, then adjust grazing practices, including fencing.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
Desert tortoise	Goal 1: Protect sufficient habitat to ensure long-term tortoise population viability.	Objective 1.1: Establish a minimum of three, preferably four, Desert Wildlife Management Areas that would be managed for the long-term survival and recovery of the desert tortoise, and which would also benefit other special-status plant and animal species. Objective 1.2: Ensure that at least one DWMA exceeds 1,000 square miles in size. Objective 1.3: Design DWMAs so that they are well distributed across the recovery unit, edge-to-area ratios are minimized, impediments to the movement of tortoises are avoided, and (where feasible) boundaries are contiguous.	Utilize results from the specific monitoring studies that follow to assess the effectiveness of DWMA configuration to maintain or increase tortoise population. (Ongoing)	If habitat continues to be degraded and tortoises continue to die at elevated numbers without any evidence of sustained recruitment, then IT, BLM, regulatory agencies, etc. should consider establishing new regions to be fenced that are at least 50 square miles in size, and managed similar to the DTNA. If results of pilot studies are successful, then headstarting could be used in these fenced areas to bolster the fenced population.
	Goal 2: Establish an upward or stationary trend in the tortoise population of the West Mojave Recovery Unit for at least 25 years.	Objective 2.1: Achieve population growth rates (lamdas) within DWMAs of at least 1.0. Objective 2.2: Attain a minimum average population density of 10 adult female tortoises per square mile within each DWMA. Objective 2.3: Establish a program for tortoise population monitoring that would detect an increase, decrease, or stable trend in tortoise population densities, and include an information feedback loop that ensures that necessary changes would be made in management.	(Population monitoring) Line distance sampling (page 2-160; 2-161) 2-163-165 (M-98) line distance sampling program in the DWMAs. (#1) Desert tortoise: Conduct continued studies at specified intervals on pertinent BLM permanent study plots including Kramer, Lucerne, DTNA, Fremont Valley, and Fremont Peak. (#1) Desert tortoise: Continue studies on the permanent study plots at the Goldstone Deep Space Tracking Station, and in the Alvord Mountains and elsewhere in the Superior-Cronese DWMA.(#1) Conduct studies to determine the effects of the removal of sheep grazing from the Fremont-Kramer DWMA on tortoise populations.(#4) To monitor OHV impacts, reinitiate	(Population monitoring) If the MOG, DMG, etc. recommend the use of the latest population census methods, then ensure that they are used. If the results of population studies indicate that recovery is not occurring, then adjust management practices as needed (Headstarting) If the headstarting program proves effective in bolstering population, then implement it in other places within DWMAs where tortoises have been extirpated.

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			studies at the Johnson Valley study plot. (#1) (Headstarting) Longitudinal monitoring for a minimum of 15 years to determine efficacy of program. (#1) Must monitor and minimize raven impacts on hatchling tortoises at nurseries.(#1)	
	Goal 3: Ensure genetic connectivity among desert tortoise populations, both within the West Mojave Recovery Unit, and between this and other recovery units.	Objective 3.1: Delineate and maintain movement corridors between DWMAs, and with the Eastern Mojave Recovery Unit, the Eastern Colorado Recovery Unit, and the Northern Colorado Recovery Unit. Objective 3.2: Ensure a minimum width of two miles for movement corridors, and include provisions for major highway crossings.		(Translocation) If the impermeable barriers between some DWMAs proves a hinderance to genetic connectivity and research shows that there is truly enough genetic difference among DWMAs, then translocation effort of individual tortoises should be considered. (Headstarting) If genetic difference between DWMAs is established then a headstarting program will be followed with collection of gravid females and the laying of pathogen-free eggs in established nurseries.
	Goal 4: Reduce tortoise mortality resulting from interspecific (i.e., raven predation) and intraspecific (i.e., disease) conflicts that likely result from human-induced changes in the ecosystem processes.	Objective 4.1: Initiate proactive management programs addressing each conflict, to be implemented by each affected agency or jurisdiction. Objective 4.2: Establish an environmental education program to facilitate public understanding and support for proactive management programs necessary to reduce tortoise mortality. Objective 4.3: Continue research programs and monitoring programs that assess the relative importance of human activities and natural processes that affect desert tortoise populations.	Monitor filming activities on private land within DWMAs to avoid or minimize impacts to tortoises and burrows. (ongoing) (Disease) (DT-17) Monitor for disease outbreaks concurrently with line-distance sampling and plot studies. (#1) Monitor dust emissions from mining sites, agricultural fields, road edges, disturbed playas for toxic elements. (#4) Monitor tortoise health status concurrently with line-distance sampling and plot studies. (#1) Necropsy all ill, dying and recently	DT-2: If biological monitoring shows that filming is adversely affecting tortoises inside DWMAs, the Implementation Team will consider remedial actions, which if deemed necessary, could include the prohibition of all filming activities from DWMAs. (Disease) (DT-16) If the Implementation Team, MOG, etc. identify any breakthrough in disease management, then it should be incorporated into the plan. If scientific studies show that the spread of disease can be curtailed through the closure of culverts, then consider closing culverts

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			deceased tortoises as per salvage protocols.(ongoing) Use data from line distance and other surveys to see if new die-off areas have extended further south of Highway 58 than what is reported in the Draft (#1) (Fences) (DT-19) IT monitor mortality along roads and identify measures such as fencing, culverts, signs, or speed regulators to be used to reduce or avoid unacceptable mortality levels.(#3) (DT21) Monitor fences and culverts to ensure fence integrity and unobstructed culverts.(ongoing) (DT-22) Monitor efficacy of solution worked out with Silver Lakes Association to address impacts on the Fremont-Kramer DWMA.(#1) Monitor integrity of new and old fences between BLM open areas and adjacent DWMAs (e.g., El Mirage's existing fence, Camp Rock Road's new fence.(ongoing) (Feral dog) Identify feral dog problem areas within DWMAs (concurrently done with tortoise population studies). (#1) Feral dog Management Plan should have a monitoring component that specifically looks at the distribution and intensity of feral dog problems. (#3) (Grazing) • Conduct health assessments as scheduled.(ongoing) • Monitor integrity and function of fences to maintain Exclusion Areas and minimize	along fenced roads. (Fences) (DT-22) If impacts to the Fremont-Kramer DWMA by OHV originating in the Silver Lakes community are not curtailed following the working group suggestions, then fencing may be necessary. (Feral dogs) If monitoring or other information shows that feral dog impacts are adversely affecting tortoises within DWMAs, then elevate the priority of this program. (Grazing) If range land health assessments identify areas of noncompliance, then implement corrective measures such as fencing, seasonal closures, pasture rotation.

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			cattle use outside the allotment (ongoing) • Allotment-specific studies should be performed to determine the threshold at which there would be sufficient ephemeral forage quantity and quality to promote healthy tortoises and habitat.(#1) (Guzzler) Conduct monitoring to see if tortoise mortality is an issue. Also attempt to ascertain use of guzzlers by known tortoise predators.(#3) (Incidental take) Presence-absence surveys will be used to (a) report level of authorized incidental take to regulatory agencies; (b) report level of 1% AGD attributed to each jurisdiction; (c) provide results of surveys to ensure appropriate boundaries for Survey and No Survey Areas (ongoing) (Law enforcement) The BLM will provide for DWMA-directed law enforcement and other public outreach through recreational technicians to help minimize incidences of poaching, vandalism, pet collection, etc.(#1) (Ravens) (DT-39) Monitor both raven status and effectiveness of management actions at reducing predation rates on juvenile tortoises.(#1)	(Guzzler) If guzzlers are determined to be a problem, then take appropriate steps to modify guzzlers while retaining their function to prevent further tortoise entrapment. Install predator prohibitive devices as needed. (Incidental Take) If the boundary lines for Survey versus No Survey Areas are not accurately portraying where tortoise are found, then modify the boundary lines using the data collected on where there is take. (Law Enforcement) Tracking of law enforcement activities: If there are problem areas identified (increased poaching, illegal target shooting), then identify issue-specific solutions (increased law enforcement presence). (Ravens) (DT-32) If the reduction of road kill is not reducing raven numbers and tortoise mortality, then modify recommendations based on information available. (DT-38) If the two interagency work groups established to oversee management direction and implementation of the raven management plan in the California desert recommend a change in policy, then ensure that future phases are developed and implemented in accordance with results of research and

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			(Route reductions) The efficacy of route closures to minimize impacts to tortoises must be monitored to determine if new roads are being created, closed routes are being used, route proliferation is resulting, etc.(ongoing)	monitoring. (Route reductions) If monitoring data indicates a problem with routes of travel (e.g. route proliferation, habitat degradation or increased tortoise mortality), then consider corrective measures as needed (increased law enforcement, fencing, modified route network).
Ferruginous hawk	Goal 1: Minimize electrocutions	Objective 1: Require raptor-safe electrical distribution lines for all new construction Objective 2: Identify problem poles on electrical distribution lines and retrofit as necessary.	(M-22) Coordinate with local bird clubs and electrical utilities to conduct winter population surveys. (#2). (M-23) Compile records of electrocutions from incidental sightings, reports from the public and reports from utilities to identify "problem poles". (Ongoing) (M-24) utilize results of winter surveys to update the BLM's Key Raptor Area database (#2).	(AM-22) If electrical towers are identified in wintering areas as causing electrocutions then retrofit the problem electrical towers or create safe perches.
Golden eagle	Goal 1: Maintain population numbers Goal 2: Preserve at least 90% of the baseline number of nesting territories. Goal 3: Minimize electrocutions.	Objective 1: Reduce disturbance at nest sites. Objective 2: Establish a new baseline number of nesting territories within five years of Plan adoption. Objective 3: Require raptor-safe electrical distribution lines for all new construction. Objective 4: Identify problem poles on electrical distribution lines and retrofit as necessary.	(M-26) Conduct surveys to determine occupancy and threats at all nests present in 1979 (#1). (M-27) Compile a record of electrocutions from the public and utilities. (Ongoing) (M-28) coordinate with utilities to monitor nests on transmission lines (ongoing). (M-24) Update Key Raptor Area database. (#2)	(AM-24) If new threats to nest sites are identified then take corrective actions. (AM-25) If electrocutions are occurring then retrofit problem electrical towers. (AM-26) If electrocutions are occurring then construct nest platforms on transmission line sites.

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Gray vireo	Goal 1: Conserve at least one core block of suitable nesting habitat.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Identify other occupied habitat.	Conduct surveys of nesting pairs in Conservation Area every five years. (#3) Identify and monitor threats to occupied habitat. (#3)	(AM-27) If cowbirds are found to be a threat, then initiate cowbird control. If threats are identified for new nest sites then manage that area to minimize threats
Inyo California towhee	Goal 1: Conserve and enhance all riparian habitat on public lands within the range of the Inyo California towhee	Objective 1: Remove non-native vegetation at springs with occupied habitat. Objective 2:Fence springs as necessary to protect the riparian habitat from damage by feral burros or excessive human use.	(M-32) Monitor spread of tamarisk and Phragmites at springs(#2) (M-33) Conduct surveys of population the Inyo California towhee in conjunction with China Lake NAWS every five years (#2) Identify threats or disturbance to occupied habitat, including parasitism by brown-headed cowbirds. (#2) Perform Proper Functioning Condition assessments in riparian areas every five years in conjunction with species surveys. (#2)	(AM-28) If Recovery Plan goals are met then initiate delisting. (AM-30) If monitoring indicates spread of invasive plants (Phragmites and tamarisk) over baseline conditions, then remove the invasives from the springs. The Bruce Canyon sites are within Wilderness and work would be performed by hand. (AM-31) If monitoring at Peach Springs indicates continuing burro damage, then install an exclosure fence. Because this site is within the Argus Mountains Wilderness, work must be performed by hand. If requirements of Proper Functioning Condition are not met, then adjust management If cowbirds are a threat to nesting towhees, then eradicate them.
Kelso Creek monkey-flower	Goal 1: Protect all occurrences and potential habitat on public lands as a Conservation Area.	Objective 1: Protect occupied habitat from disturbance.	(M-34) Conduct presence absence surveys on public land identified as potential habitat (#2). (LG-9) BLM would make an assessment of regional rangeland health on public lands in the Rudnick common allotment within two years of Plan approval. (#1)	(AM-32) If new populations are discovered then BLM will adjust boundaries of conservation area. (AM-33) If open routes threaten occupied habitat, then change route designation in area. (AM-34) If results of the rangeland health assessments in Kelso Valley indicate consumption or trampling of the flower, then adjust grazing practices.

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				(AM-35) If newly discovered populations on private land are found, then pursue land purchase or exchange on a high priority.
Kern buckwheat	Goal 1: Protect all known occurrences.	Objective 1: Protect occupied habitat from disturbance.	(M-36) Perform annual review of compliance with HCP protection measures, with an objective of detecting new disturbance in occupied habitat. (Ongoing)	If new disturbance proves to be a threat to occupied habitat then prevent disturbance, including fencing and route designation If monitoring shows that the habitat is damaged by wet weather off-road travel, the road will be closed during wet periods or during the rainy season, at the discretion of BLM's Ridgecrest Field Office.
Lane Mountain milkvetch	Goal 1: Protect viable unfragmented habitat throughout the limited range.	Objective 1: Acquire occupied habitat on private lands. Objective 2: Minimize potential impacts on public lands.	(M-36) Perform annual review of compliance with HCP protection measures, with an objective of detecting new disturbance in occupied habitat. (Ongoing) (M-38) Report annually on progress of acquisitions. (Ongoing)	(AM-36) If significant populations are found, then adjust boundaries of ACEC and withdraw from mineral entry.
Least Bell's vireo	Goal 1: Conserve *and enhance* all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Maintain Proper Functioning Condition of riparian areas Objective 4: Eradicate invasive riparian plants in suitable nesting habitat.	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, Mojave River, and other known nest sites to determine number of nesting pairs. (#1) Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments in the riparian areas every five years (#2)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use. (AM-14) If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage. (AM-27) If cowbirds prove to be a threat, then initiate cowbird control. If Proper Functioning Condition requirements are not met, then adjust management in the riparian areas such as eradication of invasive riparian plants.

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LeConte's Thrasher	Goal 1: Protect and enhance known populations and habitat.	Objective 1: Conserve habitat for thrasher within tortoise DWMAs. 1.1_ Objective 2: Establish a series of reserves representing all historic areas	Record new sightings in plan database. (Ongoing) Use the new sightings and records compiled over time to define the densest populations, and define specific areas where more intensive vehicle management is needed and where vehicle restrictions could be relaxed. (#3)	If there are OHV conflicts, then more intensive management is needed (signing, seasonal restrictions, law enforcement)
Little San Bernardino Mountains gilia	Goal 1: Protect all occurrences on public lands and 90% of the known populations on private land. Goal 2: Protect the drainages and fluvial processes that maintain the gilia populations.	Objective 1: Protect occupied habitat within 100 feet of the edges of dry washes on both sides as a Conservation Area. Objective 2: Limit channelization of washes with occupied habitat.	(M-41) Conduct presence absence surveys on BLM parcels near Joshua Tree, and north of Yucca Valley near Rattlesnake Canyon. (#3) Monitor occupied habitat for weed invasion, OHV disturbance, and other human-caused ground disturbance. (#2)	If new occupied habitat is identified then adjust boundaries of Conservation Area. (AM-42) If: (1) New populations are found and protected or (2) The dry wash conservation measures are in place (conservation easements, setbacks, and prohibitions on vehicle travel in occupied washes) then remove the limitation on take on private land. If new populations are discovered and the need for an increase in the take limit becomes apparent, then the Plan will be amended for this species. If occupied habitat is threatened, then take appropriate protective actions, which may include fencing, barriers to vehicle access or weed eradication.
Long-eared owl	Goal 1: Preserve all nest sites and communal roosts.	Objective 1: Maintain Proper Functioning Condition of riparian areas 1.2_ Objective 2: Minimize human disturbance at nest sites and communal roosts.	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, Mojave River, Argus Mountains and other known nest sites, to determine number of nesting pairs. Report results to the BLM National Raptor Database. (#1) Perform Proper Functioning Condition assessments every five years in the riparian areas.(#2)	(AM-43) If new nest and communal roost sites are discovered then protect them. If Proper Functioning Condition requirements are not met, then adjust management in the riparian areas such as eradication of invasive riparian plants. If great-horned owls are impacting long-eared owls, then potential solutions might involve destruction of great-horned owl

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			Determine if great-horned owls are displacing or preying upon long-eared owls. (#4) Monitor disturbance of nest and communal roost sites. (#2)	nests. If disturbance is causing abandonment of nest or roost sites, then provide for seasonal or permanent closure of routes that may cause disturbance and or fencing
Mojave fringe-toed lizard	Goal 1: Establish Conservation Areas at eight of the fourteen occupied habitats.	Objective 1: Maintain blowsand ecological processes at the eight identified sites. Objective 2: Protect occupied habitat.	(M-50) Delineate blowsand habitat at Alvord Mountain, Pisgah, Cronese Lakes, and northeast of Harper Dry Lake. (#2) (M-52) Construction of windbreaks and exotic plants potentially affecting occupied habitat should be monitored. (#2) Monitor disturbance of occupied habitat by OHVs. (#1) Conduct periodic presence/absence surveys for the Mojave fringe-toed lizard at conserved sites. (#3) (M-51) Measure dune movement. (#3)	(AM-49) If important new blowsand processes are identified then adjust boundaries as necessary to protect drainages and wind transport area and extend conservation downwind if warranted. If occupied habitat is impacted by increased disturbance then increase law enforcement and/or signs.
Mohave ground squirrel	Goal 1 (habitat): Ensure long-term protection of unfragmented MGS habitat throughout the species range.	Objective 1.1: Establish management areas for the long-term conservation of MGS habitat: (a) the MGS Conservation Area and (c) heightened project review in northeastern Los Angeles County. Objective 1.2: Allow for adjustments to the MGS Conservation Area boundary based on findings of scientific studies. Objective 1.3: Implement appropriate actions to ensure the long-term protection of habitat in the MGS CA throughout the life of the Plan Objective 1.4: On a yearly basis,	A monitoring strategy would be designed and implemented by the IT, in coordination with the MGS Technical Advisory Group. (#1) Perform trapping studies in Kern County Study Area to see if MGS occurs west of Highway 14 and south of Highway 58.(#3) On a yearly basis, track the loss of MGS habitat compared to the conservation of MGS habitat resulting from Plan implementation (ongoing)	If scientific study shows that the MGS CA is too small to conserve the MGS, then IT and others should consider means of acquiring private lands (or easements thereon) to ensure the conservation area is sufficiently robust. (MGS-5) If trapping in Kern County Study Area identifies significant populations, then consider adding it to the conservation area. The conservation strategy should continue to evolve as new scientific information becomes available. If so-called "core areas" are identified, then IT and regulatory agencies should consider additional means of protecting and

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		track the loss of MGS habitat resulting from Plan implementation. Objective 1.5: Cooperate with military installations by sharing scientific information and reviewing management plans.		conserving that habitat. If current missions at either Edwards Air Force Base or China Lake Naval Air Weapons Station change substantially so that the current levels of protection are substantially reduced, then IT and regulatory agencies should reconsider the conservation strategy.
	Goal 2 (population): Ensure long-term viability of the MGS throughout its range.	Objective 2.1: Minimize and fully mitigate the impacts of the Plan's authorized incidental take of the MGS. Objective 2.2: Determine the following measurable biological parameters: (1) the regional status, (2) potential hot spots (refugia), (3) genetic variation throughout the range, and (4) the ecological requirements of the MGS.	On a yearly basis, track the loss of MGS habitat compared to the conservation of MGS habitat resulting from Plan implementation (ongoing) Establish long-term study plots throughout the range, including the Coso Range Plots, and annually monitor their MGS populations. Conduct presence/absence surveys in the northern portion of the Antelope Valley in Kern County.	If so-called "core populations" are identified, then IT and regulatory agencies should consider additional means of protecting and conserving those MGS. IT should consider the feasibility and conservation value of site-specific mineral purchase or withdrawal. Use the biological and population data from Goal 2, Objectives 2.2 to modify the management prescriptions, as necessary, to ensure the long-term viability of the species.
Mojave monkey-flower	Goal 1: Protect viable populations on public land throughout the range. Goal 2: Coordinate with mining companies to protect this species.	Objective 1: Establish a core reserve on public land in the Brisbane Valley. Objective 2: Establish a core reserve west of the Newberry Mountains. Objective 3: Provide site-specific management of occupied habitat on public lands outside the core reserves. Objective 4: Establish a private land mitigation bank	Incorporate results of monitoring by OHV commission into database (ongoing) (M-47) Monitor vehicle tracks to assess spillover effects, if any, from OHV open areas (#1) (M-48) Determine acres of occupied habitat in rainy years on public land in Brisbane Valley portion of conservation area between I-15 and Mojave River (#1). . (M-49) Continue presence absence surveys of remainder of core reserves and adjacent areas (#3). LG-18) Range land health assessments would be completed within one year of	(AM-44) If grazing proves to be a threat, then adjust grazing prescriptions in eastern conservation area with seasonal or area-specific restrictions. (AM-45) If significant new occurrences are found on public lands or if opportunity arises on two sections designated as "potential additions" or with Catellus land exchanges, then add to Brisbane Valley conservation area. If surveys prove flowers are absent, then delete lands from eastern conservation area. (AM-46) If OHV use proves to be impacting occupied habitat, then sign or fence habitat adjacent to Stoddard Valley Open Area. Fence as necessary in Brisbane Valley

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			plan adoption for Ord Mountain allotment. (#1) Mining companies will conduct surveys on mining lands. (#1)	If mining company surveys detect flowers within mining area then establish boundaries of mitigation bank.
Mojave River vole	Goal 1: Conserve all remaining riparian and wetland occupied habitat. Goal 2: Conduct research and monitoring programs.	Objective 1: Establish permanent study plots and conduct baseline studies. Objective 2: Monitor changes in vole populations and habitat. Objective 3: Identify, map and survey all appropriate habitat along the Mojave River corridor. Objective 4: Maintain groundwater levels in Mojave River that support the riparian habitat. Objective 5: Maintain Proper Functioning Condition of riparian areas Objective 6: Manage disturbance to riparian habitat, including visitor use. Objective 7: Remove non-native vegetation on public land and on private land where permission is granted.	Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform riparian area Proper Functioning Condition assessments every five years (#2)	If excessive damage is detected to occupied habitat, then manage visitor use by fencing areas. (AM-14) Cooperate with water agencies to provide additional water to Mojave River. If groundwater levels at monitoring wells are not maintained, drop permit coverage. If PFC assessments identify invasive plants as a threat, then eradicate them.
Mojave tarplant	Goal 1: Protect viable populations on public lands. These populations may be disjunct.	Objective 1: Require 50% conservation of newly detected populations on private land.	(M-56) Determine acres of occupied habitat at Short Canyon and Cross Mountain every five years. (#2) (LG-9) BLM will make a regional rangeland health assessment on public lands in the Rudnick common allotment within two years of Plan approval. (#1)	(AM-53) If Mojave tarplant are consumed or trampled in Short Canyon and on Cross Mountain, then adjust grazing practices with seasonal closures or fencing. (AM-54) If existing or new populations are threatened by vehicles or grazing, then protect them by providing barriers to vehicles or livestock. (AM-104) If significant new populations are found on public lands, then manage as an ACEC. If private land conservation is judged to be

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				necessary at new locations, then the sites will be given a high rating on the acquisition priority list maintained by the Implementation Team.
Ninemile Canyon phacelia	Goal 1: Protect viable populations on public land throughout the range.	Objective 1: Prevent or reduce damage from grazing. Objective 2: Require 50% conservation of newly detected populations on private land.	(LG-9) BLM will make a regional rangeland health assessment on public lands in the east Sierra Canyons within two years of Plan approval. (#1)	If Ninemile Canyon phacelia are consumed or trampled then adjust grazing practices with seasonal closures or fencing.
Parish's alkali grass	Goal 1: Conserve the single private land location. Goal 2: Determine if additional populations are present at other alkaline springs and seeps.	Objective 1: Acquire Rabbit Springs if willing seller.	(M-60) Establish baseline population numbers and acreage of occupied habitat at Rabbit Springs. (#2) (M-3, 95) Conduct surveys of other alkaline springs and seeps to determine if other populations are present in the planning area. (#1)	(AM-59) If new locations are found, then acquire, secure water rights or protect from grazing. (AM-103)) If species is found at private land at Oasis of Mara then acquire from willing seller.
Parish's phacelia	Goal 1: Preserve large intact populations on the publicly owned dry lakebeds. Goal 2: Conserve a public land corridor connecting the dry lakes.	Objective 1: Establish Conservation Area including occupied habitat and essential connectivity. Objective 2: Acquire private land within Conservation Area from willing seller. Objective 3: (HCA-3) prohibit vehicle traffic on playas within Conservation Area. Objective 4: (P-48) San Bernardino county will perform site-specific review for projects within occupied habitat. Objective 5: (P-50) BLM will require restoration of occupied habitat.	Census populations every five years, with an estimate of acreage of occupied habitat (#3) (M-59) Perform annual report describing vehicle traffic, if any, on playas. (#1)	(AM-58) If new locations are found, then protect with fencing or signing at edge of playas.
Parish's popcorn flower	Goal 1: Conserve the single private land location.	Objective 1: Acquire Rabbit Springs if willing seller.	(M-60) Establish baseline population size and area of occupied habitat at Rabbit Springs. (#2)	(AM-59) If new locations are found, formulate protection plans. Measures could include acquisition, securing water rights, or

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
	Goal 2: Determine if additional populations are present at other alkaline springs and seeps.		(M-3) Conduct surveys of other alkaline springs and seeps to determine if other populations are present in the Planning area. (#1)	protection from grazing. (AM-103) If species is found at private land at Oasis of Mara then acquire from willing seller.
Prairie falcon	Goal 1: Preserve all nest sites. Goal 2: Maintain population numbers	Objective 1: Reduce disturbance at nest sites.	(M-26) Conduct surveys to determine occupancy and threats at all nests present in 1979 (#1). (M-24) Update Key Raptor Area databases at five-year intervals. (Ongoing) (M-66) Report on falconry take permits. (Ongoing)	(AM-24) If new threats to nest sites are identified then take corrective actions. If newly discovered nest sites are disturbed by vehicular traffic then implement seasonal closures.
Red Rock poppy	Goal 1: Conserve and maintain all occurrences in the El Paso Mountains.	Objective 1: Reduce or eliminate threats, including disturbance from OHV use. Objective 2: Require 50% conservation of newly detected populations on private land.	(M-67) Conduct review of effects of OHV use on known populations. (#1) (M-68) Coordinate population surveys with Red Rock Canyon State Park. (#2) Perform population census every five years. (#2)	(AM-62) If monitoring shows damage to occupied habitat, then provide barriers to vehicles. (AM-63) If significant population is discovered on public land then amend the desert plan to establish an ACEC that encompasses new populations.
Red Rock tarplant	Goal 1: Conserve and maintain all occurrences in the El Paso Mountains.	Objective 1: Reduce or eliminate threats, including disturbance from OHV use. Objective 2: Require 50% conservation of newly detected populations on private land.	(M-67) Conduct review of effects of OHV use on known populations. (#1) (M-68) Coordinate population surveys with Red Rock Canyon State Park. (#2) Perform population census every five years #2)	(AM-62) If monitoring shows damage to occupied habitat, then provide barriers to vehicles. (AM-63) If significant population is discovered on public land then amend the desert plan to establish an ACEC that encompasses new populations.
Salt Springs checker-bloom	Goal 1: Conserve the single private land location. Goal 2: Determine if additional populations are present at other alkaline springs and seeps.	Objective 1: Acquire Rabbit Springs if willing seller. Objective 2: Require 90% conservation of the Salt Spring checkerbloom occupied habitat at newly found sites, along with maintenance of the hydrological regime.	(M-60) Establish baseline population numbers and area of occupied habitat at Rabbit Springs. (#2) (M-3) Conduct surveys of other alkaline springs and seeps to determine if other populations are present in the Planning area. (#1)	(AM-59) If new locations are found, then formulate protection plans. Measures could include acquisition, securing water rights, or protection from grazing. (AM-103) If species is found at private land at Oasis of Mara then acquire from willing seller.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
San Diego horned lizard	Goal 1: Conserve unfragmented habitat within the range.	Objective 1: Conserve two large representative areas, Big Rock Creek and Mescal Creek, with connectivity of the overall range through the National Forests. Objective 2: Acquire lands within Antelope Valley Significant Ecological Area.	(M-74) Monitor surface disturbance at Big Rock Creek and Mescal Creek. (#3)	(AM-69) If conserved habitat is disturbed in an edge effect, then fence and post signs.
Short-joint beavertail cactus	Goal 1: Conserve unfragmented habitat within the range.	Objective 1: Conserve two large representative populations that are contiguous with National Forest lands. Objective 2: Acquire lands within Antelope Valley Significant Ecological Area.	(M-75) Establish baseline population numbers for Big Rock Creek and Mescal Creek areas. (#2) (M-76) Determine numbers and identity of beavertail cacti in eastern part of the range. (#3)	(AM-71) If beavertail cactus are disturbed during a project, then salvage and relocate plants within urban development areas. (AM-72) If development pressure increases, then create mitigation banks in the western part of the range. If the populations in the eastern part of the range prove to be distinct, then create smaller reserves as mitigation banks.
South-western pond turtle	Goal 1: Conserve all remaining populations throughout the range.	Objective 1: Identify new populations in suitable habitat. Objective 2: Conserve all remaining populations in the Mojave River, Lake Elizabeth and Amargosa Creek. Maintain groundwater levels in Mojave River that support the riparian habitat. Objective 3: Maintain Proper Functioning Condition of riparian areas in occupied habitat. Objective 4: Continue restoration at Camp Cady and Afton Canyon.	(M-79) Conduct presence absence surveys of Kelso Creek and Jawbone-Butterbredt ACEC in suitable habitat. (#2) Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments in riparian areas every five years. (#2)	If riparian area Proper Functioning Condition requirements are not met, then adjust management including provide barriers to vehicles or livestock.
South-western willow flycatcher	Goal 1: Conserve *and enhance* all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon and in Mojave River to determine number of nesting pairs. (#1)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
		restoration and expansion by natural means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Maintain Proper Functioning Condition of riparian areas in Kelso Valley and east Sierra Canyons. . Objective 4: Achieve regional public land health standards for grazing in Kelso Valley and in east Sierra canyons. Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.	Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments of the occupied habitat in the Mojave River every five years. (#2) Initiate first riparian assessment in Kelso Valley and east Sierra Canyons within two years of Plan approval. (#1)	(AM-14) If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage. If riparian area Proper Functioning Condition requirements are not met, then adjust management including eradicating invasive riparian plants, seasonal grazing restrictions and fencing. (AM-27) If cowbirds prove to be a threat, then initiate cowbird control.
Summer tanager	Goal 1: Conserve *and enhance* all *suitable* riparian nesting habitat outside developed areas.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas. Objective 5: Eradicate invasive riparian plants in suitable nesting	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1) Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments in riparian areas every five years (#2)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use. (AM-14) If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage. If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants (AM-27) If cowbirds prove to be a threat, then initiate cowbird control.

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
		habitat.		
Triple-ribbed milkvetch	Goal 1. Prevent any loss of occupied habitat Goal 2. Conduct research and monitoring.	Objective 1. Require avoidance of known or newly-detected populations. Objective 2. Compile new information to determine best conservation strategy.	Record new locations. Census known locations periodically.	Acquire private lands with newly-detected occupied habitat
Vermilion flycatcher	Goal 1: Conserve *and enhance* all *suitable* riparian nesting habitat outside developed areas.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas. . Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1) Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments in riparian areas every five years (#2)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use. (AM-14) If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage. If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants (AM-27) If cowbirds prove to be a threat, then initiate cowbird control.
Western snowy plover	Goal 1: Preserve all nest sites and maintain and enhance nesting and wintering habitat on public lands.	Objective 1: Prevent disturbance of nest sites during nesting season.	(M-84) Conduct periodic censuses to determine number of nesting pairs at Harper Dry Lake, and Dale, Koehn, and Searles lakes. (#3) Monitor disturbance at known nest sites. (Ongoing)	(AM-84) If nest sites are disturbed, then close playa edges to vehicular traffic in spring and provide temporary fencing of nest sites if warranted.
Western yellow-billed cuckoo	Goal 1: Conserve *and enhance* all suitable riparian nesting habitat.	Objective 1: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural	(M-85) (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, Mojave River, and other known nest sites to determine number of nesting pairs. (#1)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use. (AM-14) If cooperating with water agencies

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
		means. Objective 2: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 3: Maintain Proper Functioning Condition of riparian areas in Kelso Valley and east Sierra Canyons. . Objective 4: Eradicate invasive riparian plants in suitable nesting habitat.	Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments in riparian areas every five years (#2)	to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage. If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants
White-margined beardtongue	Goal 1: Preserve the wash and sand field habitat of the disjunct population on public land.	Objective 1: Establish Conservation Area near Pisgah Crater.	(M-87) Census plant populations at known locations (#2) (M-88) Monitor vehicle use of Argos Wash. (#2) Monitor the Johnson Valley to Parker race. (Ongoing)	(AM-89) If monitoring shows damage along utility corridors or in Argos Wash, then fence populations.
Yellow-breasted chat	Goal 1: Conserve *and enhance* all suitable riparian nesting habitat.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas.	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1) Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments in riparian areas every five years (#2)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use. (AM-14) If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage. If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants (AM-27) If cowbirds are found to be a threat, then initiate cowbird control

SPECIES	BIOLOGICAL GOALS	BIOLOGICAL OBJECTIVES	MONITORING	ADAPTIVE MANAGEMENT
		Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.		
Yellow-eared pocket mouse	Goal 1: Maintain and enhance existing habitat.	Objective 1: Manage grazing on public lands to maintain habitat values.	(M-93) Conduct presence absence survey in east Sierra Canyons and public land in Kelso Valley (#4). A trapping survey would be conducted in Kelso Valley as part of the Monitoring Plan. (#3) (LG-9, M-94) BLM would conduct rangeland health assessments for allotments within the range of the yellow-eared pocket mouse within five years of Plan approval. (#1)	(AM-13, AM-34) If rangeland health assessments in the east Sierra canyons and Kelso Valley indicate damage to occupied habitat, then adjust grazing practices. (AM-96) If new location data identifies populations on private land, then prioritize acquisition lands.
Yellow warbler	Goal 1: Conserve *and enhance* all suitable riparian nesting habitat.	Objective 1: Establish a conservation area at Big Rock Creek. Objective 2: Achieve and sustain groundwater levels in the Mojave River floodplain sufficient to maintain riparian habitat and allow its restoration and expansion by natural means. Objective 3: Manage disturbance to riparian habitat, including grazing and visitor use. Objective 4: Maintain Proper Functioning Condition of riparian areas. Objective 5: Eradicate invasive riparian plants in suitable nesting habitat.	(M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1) Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1) Perform Proper Functioning Condition assessments in riparian areas every five years (#2)	If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use. (AM-14) If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage. If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants (AM-27) If cowbirds are found to be a threat, then initiate cowbird control

2.2.8.1 Alkali Wetland Communities Supplementary Discussion:

Alkali springs, seeps, and meadows have the highest priority for community protection in the West Mojave Plan because of the potential for conservation of rare plant species and because these areas have not been extensively inventoried.

Table 2-26 includes the monitoring measure to conduct presence absence surveys at alkaline springs, seeps and playas (prescription M-3). Table 2-27 lists target and high interest species, and sites to be surveyed.

Table 2-27
Rare Plant Species Found InAlkali Wetland Communities

SPECIES	SITES CONTAINING ALKALI SPRINGS, SEEPS AND MEADOWS
Target Species	Rabbit Springs (Lucerne Valley)
Alkali mariposa lily (*Calochortus striatus*)	Paradise Springs (north of Barstow)
Black sedge (*Schoenus nigricans*)	Cuddeback Lake (east of California City)
Hot springs fimbristylis (*Fimbristylis thermalis*)	Cushenbury Springs (Lucerne Valley)
Lancaster milkvetch (*Astragalus preussii* var. *laxiflorus*)	Harper Lake wetlands (west of Barstow)
	Oasis of Mara (Twentynine Palms)
Parish's alkali grass (*Puccinellia parishii*)	Olancha
Parish's phacelia (*Phacelia parishii*)	Green Springs - Kelso Valley
Parish's popcorn flower (*Plagiobothrys parishii*)	Turner Springs - Victorville
Parry's saltbush (*Atriplex parishii*)	Red Rock Canyon (Red Rock Canyon State Park)
Salt Springs checkerbloom (*Sidalcea neomexicana*)	Box S Springs (Lucerne Valley)
	Koehn Lake (Kern County)
Other High Interest Species	Barrel Springs (Palmdale)
Cooper rush (*Juncus cooperi*)	San Andreas Rift Zone (Palmdale)
Tecopa bird's beak (*Cordylanthus tecopensis*)	Jack Spring (south of Fort Irwin)

2.2.8.2 Desert Tortoise Supplementary Discussion

Line Distance Sampling Surveys: (M-98) A line distance sampling program (or other scientifically credible method, if distance sampling proves ineffective) would be implemented in the Fremont-Kramer, Superior-Cronese, Ord-Rodman, and Pinto Mountain DWMAs. To date, this is the only method that has been identified to determine tortoise densities and population trends on a regional basis. It has full endorsement of the Management Oversight Group, consisting of the resource managers responsible for lands and resource protection throughout the listed range of the desert tortoise (i.e., USFWS, BLM, National Park Service, Department of Defense, and state wildlife agencies).

Although there are five delisting criteria given in the Recovery Plan, the primary criterion for delisting tortoises in the West Mojave Recovery Unit, which corresponds to the Plan area, is:

> As determined by a scientifically credible monitoring plan, the population within the recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years (one desert tortoise generation).

Although there are limitations associated with the data gained through distance sampling, it remains the best available method to determine if the Recovery Plan criterion is being met or not.

Each of the four DWMAs identified in the western Mojave Desert was surveyed by distance sampling in 2001 and 2002. Current proposals by the USFWS are to survey each recovery unit every year for five years, every other year during the next five years, then every year for five years, and so on, for the duration of the Plan, which is given as 30 years. As such, distance sampling would occur in the western Mojave Desert during the following years: 2003, 2004, 2005, 2007, 2009, 2011, 2012, 2013, 2014, 2015, 2017, 2019, 2021, 2022, 2023, 2024, 2025, 2027, 2029, 2031, and 2033.

Survey costs vary, as have the densities of surveyed transects, but in general the cost is about $175/kilometer surveyed. In 2001 in the western Mojave Desert, 870 transects or 1,392 kilometers were surveyed in the four DWMAs. Given the rough cost estimate of $175/kilometer, the distance sampling effort cost about $245,000 in 2001 in the western Mojave Desert. This cost was somewhat h6igher in 2002 when more kilometers were surveyed to obtain a sufficient sample size of at least 80 tortoises per DWMA, which was not attained in 2001.

Distance sampling is necessarily restricted to a regional level; it gives the density of tortoises and the trends in those densities over time for each DWMA surveyed. Therefore, after about five years of distance sampling a density of tortoises per DWMA would be available, but the upward, downward, or stable trends in those densities would require additional sampling. Even then, the regional distribution of tortoises in different portions of a given DWMA may not be determined from distance sampling, nor would the sampling effort be sensitive enough to indicate which management prescriptions are providing the most protection to tortoises; increases or decreases in tortoise abundance may not be explained by the sampling effort. As such, it is necessary to implement monitoring efforts that track the success and failures of management prescriptions implemented as part of the Plan, which follow.

Regional Responses of Tortoises to Implemented Conservation Measures: It is important to fund continued studies at specified intervals on pertinent BLM permanent study plots, including Kramer, Lucerne, Desert Tortoise Research Natural Area (DTNA) (2 or 3 plots), Fremont Valley, and Fremont Peak. In the past, a total of 60 person days was spent on each plot, conducting a capture (first 30 days) recapture (last 30 days) study that was intended, among other things, to determine the density of tortoises on that square mile (i.e., with the exception of one of the plots at the DTNA, the other plots are one square mile in size). Since distance sampling is intended to determine regional densities, it would be appropriate to modify the methodology for the study plots away from a density estimate, and rather focus on demographic, disease, human threats, and other associated data that have traditionally been collected.

It is important to replicate the study plots, perhaps on nearby, square kilometer plots (the tortoise Recovery Plan, Appendix A, presents one approach), so that statistical inferences can be drawn for a given region. Thus, additional, new study plots would be randomly situated throughout the region of interest. In the past, these plots have been surveyed at four-year intervals, although a new schedule needs to be considered. Each of the existing study plots is uniquely situated to gauge

continued threats and efficacy of conservation measures implemented as part of the Plan, as described in the following sections.

Kramer Study Plot: This plot is located several miles west of the community of Silver Lakes, in the southern portion of the Fremont-Kramer DWMA, which is bounded to the north by Highway 58, to the east by the Mojave River, to the south by Shadow Mountain Road (actually several miles south of this road), and to the west by Highway 395. Unlike the northern and northwestern portions of this DWMA, there still appear to be relatively high numbers of tortoises in this area. The Kramer plot and surrounding areas are characterized by above-average tortoise sign counts collected since 1998. Known threats include ravens, poaching, off highway vehicle traffic (some of it likely from the Silver Lakes community), dumping, and dirt roads. Monitoring at this and adjacent plots should be structured to see if positive benefits are associated with the following conservation programs: raven management, increased law enforcement, route reductions, urban interface fencing or other control measures at Silver Lakes and fencing Highway 395.

Lucerne Study Plot: This plot is uniquely situated on the urbanizing interface with Lucerne Valley to the south and the Johnson Valley Open Area to the east; the Stoddard Valley Open Area is not too distant to the west. It occurs in one of three tortoise aggregations found in the Ord-Rodman DWMA. Documented threats include OHV impacts, cattle trespass, bisection by a major transmission line inside a BLM-designated utility corridor, raven predation, tortoise collection and vandalism, and feral dogs. Proactive management prescriptions given elsewhere in this Plan call for signing boundaries in this area, fencing portions of the cattle allotment to prevent cattle trespass, monitoring Camp Rock Road, raven management, route reductions, restrictions to development of new utilities, increased law enforcement, and education of Lucerne Valley residents with regards to resource conservation. The monitoring program on this and replicated plots in the region should focus on the efficacy of these and other conservation programs implemented by the Plan.

Desert Tortoise Research Natural Area: Several BLM permanent study plots are found at the DTNA, although like other plots, they have not been regularly funded since the early 1990's. These plots are unique in that they occur in a relatively protected, fenced area in which densities of more than 200 tortoises per square mile were documented in the 1970's and mid-1980s, but where present densities are substantially lower. Monitoring of this plot provides a unique opportunity to see if tortoises can naturally recolonize protected habitats. The fenced DTNA is surrounded by existing impacts that likely serve as "sinks" for tortoises that are relatively protected until they venture into adjacent, unfenced areas. Some of these uses include sheep grazing, intensive OHV use, agriculture and wind-blown dust from the west, indirect impacts associated with mining to the north, feral dog problems both inside and outside the DTNA, release of captive tortoises, raven predation, intentional vandalism of tortoises, and pet collection. Monitoring efforts should consider the efficacy of route reduction, enforcing California City's sheep grazing policy (i.e., prohibition of sheep grazing within city limits;), increased law enforcement, feral dog management plan, raven management, and education of visitors to the area.

Fremont Valley: This study plot is located in the Fremont Valley, which is bounded to the north by the El Paso Mountains, to the south by the Rand Mountains, to the east by Red Mountain, and to the west by Koehn Lake. It is very similar to the DTNA plots in terms of observable disturbances, except it does not occur within the relative protection of a fenced area. All the programs mentioned above for the DTNA are also intended to recover tortoises in the Fremont Valley. Unique threats include road kill along Garlock Road, the direct and indirect effects of spreading biosolids in the desert, noise, vibration, and mortality effects of the nearby railroad. Monitoring of the study plot and replicated plots in the Fremont Valley should test the efficacy of conservation measures in bolstering tortoise populations in the northwestern portion of the Fremont-Kramer DWMA.

Fremont Peak: Like DTNA and Fremont Valley, the Fremont Peak study plot has experienced recent declines in tortoise numbers, although fewer tortoises occurred when the BLM's study plots were first surveyed in the 1970's. Unlike all other study plots mentioned above, the Fremont Peak plot is characterized as a saltbush scrub community (creosote bush scrub characterizes the other plots). Sheep grazing was removed from the area in 1991, although threats persist: natural recolonization of a population that has nearly been extirpated, raven and canid predation, effects of roads (several bisect the plot), and the indirect effects of Highway 395, which is located several miles to the west. Conservation measures are recommended by this Plan that would minimize impacts associated with these and other threats. Additionally, it is recommended that the pilot headstarting program occur in the vicinity of this plot, so that the beneficial effects of that program may be indirectly gauged by reviving studies on this and replicated plots within the region.

Other Plots: The spatial location of the plots given above fairly well covers the Fremont-Kramer DWMA and southern portion of the Ord-Rodman DWMA, but does not adequately represent the Superior-Cronese or Pinto Mountain DWMAs. The Army's National Training Center at Fort Irwin, in conjunction with USGS, has established permanent study plots at the Goldstone Deep Space Tracking Station, in the Alvord Mountains, and elsewhere in the Superior-Cronese DWMA. Continuing studies on these and on newly established plots could collect valuable information. There are no permanent plots in the Pinto Mountains, although Joshua Tree National Park has such plots nearby. If the BLM desires to monitor the effects of OHV activities on tortoises, it would be appropriate to reinitiate studies at the Johnson Valley study plot, the Stoddard Valley study plot should be relocated (i.e., it occurs on private lands), and new study plots should be established in other open areas (i.e., El Mirage and Spangler Hills open areas).

Region-Specific Monitoring Studies: Many proactive conservation measures have been recommended that can be tracked at the study plots given above, however it would be necessary to gauge the success and failures of specific conservation programs for their efficacy and modification through adaptive management. Some of these follow:

- *Highway Fencing:* Some of the desired effects of fencing highways that require monitoring include: (a) reduction of tortoise mortality; (b) tortoise recolonization of unoccupied habitats immediately adjacent to the highways or interstates; (c) reduction of other vertebrate mortality and its effects on raven predation, scavenging, and nesting within a mile of the fenced highway; (d) tortoise use of culverts to offset the fragmentation of the fenced

highway; and (e) reduction of human impacts associated with the highway (such as decreased poaching, pet collection and dumping). Additionally, the fences must be monitored to cure breaches and ensure fence integrity.

- *Grazing Management:* The Plan proposes to remove sheep grazing from all DWMAs, which would affect areas south of Shadow Mountain Road in the southern portions of the Fremont-Kramer DWMA. Areas north of Shadow Mountain Road have not been grazed since 1991. The removal of sheep from this area should be followed by studies to determine the efficacy of this measure. There are also opportunities to study the effects of sheep removal on lands north of Kramer Junction, where sheep continue to graze west of Highway 395 but were removed in 1991 east of Highway 395.

  Additionally, new management prescriptions would require modified grazing practices in the Ord Mountain, Harper Lake, and Cronese Lakes allotments. These include the exclusion of cattle from specific areas when dry ephemeral forage is below a threshold of 230 pounds/acre. This practice would require rest of certain pastures under these conditions, and would concurrently result in herding cattle onto other portions of the allotment. Another proposal is to strategically place waters so that cattle are concentrated in areas where the fewest tortoise-cattle impacts would occur. The effects of these and other management practices must be monitored to determine if the desired effects (i.e., decreased tortoise mortality and decreased habitat degradation) are being achieved.

- *Route Reductions:* Alternative A proposes the closure of a number of unpaved motorized vehicle routes, with the intent of reducing tortoise mortality and habitat degradation. There is widespread concern that reducing routes would lead to more habitat degradation along routes that are designated as "open." Data should be collected to address the following: (a) Is there more or less cross country travel before or after reductions? (b) Is there more use (and vandalism) on private lands where route reductions are not occurring? (c) Are new routes being created to replace old ones? (d) Are visitors using closed routes? (e) Given these and other data, where are the best places to focus limited law enforcement resources? (f) Has poaching, illegal target shooting, intentional vandalism, etc. been curtailed or facilitated? (g) Are new concentrated human-use areas (i.e., campsites, staging areas, dump sites, etc.) forming along open routes? and ultimately, (h) Has the route network resulted in more or less tortoise mortality and/or habitat degradation?

- *Raven Management Plan:* The efficacy of this plan needs to be monitored to determine which, if any, management actions have resulted in fewer tortoise mortalities. The monitoring effort may be linked with others: Are ravens predating more heavily on tortoises after highway fences are installed and road-killed vertebrates are less available to ravens?

- *Off Highway Vehicle Fencing:* Alternative A proposes installation of new fences to counteract the effects of Johnson Valley and Stoddard Valley on tortoise populations in the Ord-Rodman DWMA. As with the recently installed fences around the El Mirage Open Area and along the Mojave-Randsburg Road, monitoring would be needed to cure intentional vandalism of the fences. Educational outreach would be a high priority at the time of fencing and thereafter. The desired effects are to reduce tortoise mortality and begin

to repair degraded habitats (i.e., in the Cinnamon Hills and southern portions of the Ord-Rodman DWMA coinciding with northern Lucerne Valley), which should be monitored and adaptive management applied, as needed. Comparison of different fence and culvert designs would be needed.

- *Urban Interface Fencing Versus Educational Outreach:* Alternative A proposes that a working group be established by the Implementation Team to work with the Silver Lakes Association and others to minimize the OHV impacts associated with that community on the Fremont-Kramer DWMA, which occurs immediately to the west. Potential solutions include installing a fence line along the western boundary of the community or developing an intensive educational program to minimize and eventually eliminate the impact. The efficacy of either of these approaches must be monitored and adaptive management applied.

- *Disease Monitoring:* There is no coordinated effort at this time to monitor diseases in the western Mojave Desert. Permanent study plots described above provide one good means of tracking diseases, but are not necessarily indicative of disease prevalence throughout the region. Line distance sampling provides even less opportunity to study diseases, as the surveys are carried out in the spring, are transitory in nature, and rarely afford the opportunity to clearly observe disease symptoms, which are most often expressed in and around the eyes or around the nostrils and mouth (i.e., most tortoises have pulled into their shells by the time they are weighed and measured as part of distance sampling). Alternative A relies on the Implementation Team adopting disease monitoring protocols as they are identified and endorsed by pertinent experts and, likely, the Management Oversight Group.

Miscellaneous Tracking Needs: Alternative A proposes a number of proactive programs that would require tracking that may be loosely described as monitoring. Some of these follow:

- *Plan-Authorized Versus Unauthorized Ground Disturbance:* Incidental take authorized by the Plan is necessarily attached to existing political infrastructure. For example, the Plan would authorize projects subject to discretionary permits but would not track projects subject to ministerial permits. It is important that authorized and unauthorized ground disturbance is tracked by the Plan to determine actual loss of habitat relative to the 1% Allowable Ground Disturbance. Agricultural development in DWMAs, which is not currently covered by the Plan, must be tracked to determine its relative impact, if any. It is generally understood that aerial photographs would be used, in conjunction with reports from participating jurisdictions, to track these forms of ground disturbance.

- *Plan-Authorized Take of Tortoises:* The Implementation Team is tasked with producing a standard data sheet and developing a tracking system to determine how many tortoises are accidentally killed or incidentally harassed as a result of Plan implementation. Such take is most likely in DWMAs, less so in most Survey Areas, and is not anticipated in tortoise No Survey Areas. These data should be used, among other things, to determine if the boundary lines for Survey versus No Survey Areas accurately portrayed where tortoises do and do not occur, respectively. It is expected that an annual review of this information would enable the Implementation Team, in conjunction with participating jurisdictions, to modify these boundary lines as needed. Keeping track of the actual take of animals would also be

important to demonstrate to the regulatory agencies, particularly USFWS and CDFG, that impacts have been mitigated to the maximum extent practicable and fully mitigated, respectively.

- *Tracking of Law Enforcement Activities:* It is important that a feedback loop exist between law enforcement and the Implementation Team to identify problem areas, and in the spirit of adaptive management, to identify issue-specific solutions.

2.3 ALTERNATIVE B: BLM ONLY

2.3.1 Overview

All aspects of this alternative's conservation strategy would be as described for Alternative A, except as specifically noted below (see foldout Map 2-15). These include Alternative A's motorized vehicle access network, livestock grazing and education programs, and all proposed CDCA Plan Amendments. Multiple use class changes proposed by Alternative A would apply to this alternative except for the following: 1) Two parcels of BLM land within the North Edwards Conservation Area would not be removed from the LTA disposal zone and reclassified from U to M and 2) Several scattered parcels of BLM land in the San Gabriel Mountains foothills and within the Los Angeles County SEAs (Table 2-4) would not be removed from the LTA disposal zone and reclassified from U to M.

2.3.2 Habitat Conservation Area

(AB-1) The tortoise conservation area would consist of 1,038,711 acres of public lands (only). Four DWMAs would be established: Fremont-Kramer, Superior-Cronese, Ord-Rodman and Pinto Mountains. The exterior boundaries of the DWMAs would correspond to those proposed by Alternative A, but would consist only of the approximately one million acres of public lands within the outer boundaries (about 425,000 acres of private lands within the outer boundary would not be affected by the designation). The DWMAs would be designated as an ACEC.

(AB-2) A Mojave ground squirrel conservation area would be designated, consisting of the 1,308,877 acres of public lands within the outer boundary proposed by Alternative A. The 420,000 acres of private lands would not be affected by the designation. The MGS conservation area would be designated as a BLM Wildlife Habitat Management Area.

(AB-3) Eleven other conservation areas composed of BLM lands (only) would be established, and designated as ACECs. Public land prescriptions (only) and external boundary lines proposed for Alternative A would apply. The eleven conservation areas would include the following ACECs: (1) Barstow Woolly Sunflower; (2) Bendire's Thrasher; (3) Carbonate Endemic Plants; (4) Coolgardie Mesa; (5) Kelso Creek Monkeyflower; (6) West Paradise; (7) Middle Knob; (8) Mojave Monkeyflower; (9) Mojave Fringe-toed Lizard; (10) Parish's Phacelia; and (11) Pisgah. The Mojave fringe-toed lizard conservation area would be limited to three units (Dale Lake, Mojave River and Pisgah); Saddleback Butte/Big Rock Creek would not be part of this conservation area.

Conservation areas would not be established at either Big Rock Creek for several species or North Edwards for the desert cymopterus and Barstow woolly sunflower. The Alkali Mariposa Lily Conservation Area would not be designated. No Special Review Areas would be designated and the MUC designations would not change for scattered parcels adjoining Joshua Tree national Park. No tortoise relocation areas would be delineated. No habitat linkages or wildlife movement corridors would be established.

2.3.3 Compensation Framework

(AB-5) Compensation for disturbance of public lands within DWMAs would be required at a 5:1 ratio within desert tortoise habitat. Funds may be directed toward habitat enhancement or rehabilitation. All compensation is to be directed to the DWMA where the disturbance occurs. Compensation is required for most authorized uses. There would be no new compensation program for disturbance of lands outside of the DWMAs, such as lands within the northwestern portion of the MGS Conservation Area or within other newly established ACECs.

(AB-6) Cumulative new surface disturbance on public lands within any DWMA would be limited to 1 percent of the federal portion of the DWMA. The amount that may be disturbed is proportional to the holding of the administering agency. The habitat credit component of Alternative A would not apply; however, existing BLM restoration programs would continue, including tamarisk removal and habitat restoration at Afton Canyon and Harper Lake, and intensive rehabilitation in recently burned areas, as in the footprint of the Willow Fire.

2.3.4 Incidental Take Permits

No regional habitat conservation plan would be adopted and implemented. On private lands, compliance with both FESA and CESA would be determined on a case-by-case basis, as at present. Separate incidental take permits would need to be obtained for each project. Protection for non-listed species on private lands would be determined by the CEQA review conducted for each project. "No surprises" assurances would not be provided.

2.3.5 Species Conservation Measures

Desert Tortoise: Tortoise Survey and No Survey areas would not be established. Presence-absence surveys and clearance surveys would be required on all public lands. Standard handling and disposition guidelines would be established for BLM lands only. Elsewhere, such guidelines would be determined on a case-by-case basis. Installation of tortoise fencing along highways would be accomplished on a project by project basis.

Tortoise prescriptions different from those proposed by Alternative A would include:

- (AB-7) Highway maintenance seasonal restrictions, roadbed and berm requirements, and preclusion of the use of invasive weeks for landscaping would apply only to portions of roads on public lands.

- (AB-8) No feral dog management program would be undertaken.
- (AB-9) Increased law enforcement within DWMAs would be limited to public lands.
- (AB-10) Project proponents could utilize level 1 "Best Management Practices" on BLM lands within DWMAs, and level 2 BMPs elsewhere. Pre-approved and programmatic level 1 and level 2 BMPs would not be available to proponents of projects located on private lands.
- (AB-11) Raven predation management would focus on public lands. The program would not address the modification of landfill and transfer station operations to reduce availability of waste to ravens, nor would landfills be precluded from locating on private lands within five miles of DWMAs.

Mohave Ground Squirrel: Los Angeles County's significant ecological areas would not be a component of the MGS conservation strategy. CDFG would continue to require trapping. CDFG's existing fee program would continue.

Other Species: A burrowing owl education program would not be implemented. Raptor-safe power lines would be required for BLM-approved powerlines only. Long-eared owl and gray vireo habitat at Big Rock Creek would not be acquired. No program would be implemented to conserve alkali wetland plants. Conservation of desert cymopterus and triple-ribbed milkvetch would rely on an avoidance requirement rather than the protection of habitat within conservation areas.

The following species could not meet all goals and objectives set for the habitat conservation plan alternatives: alkali mariposa lily, Barstow woolly sunflower, brown-crested flycatcher, burrowing owl, desert cymopterus, gray vireo, least Bell's vireo, Little San Bernardino Mountains gilia, long-eared owl, Mojave fringe-toed lizard, Mojave River vole, Parish's alkali grass, Parish's popcorn flower, Salt Springs checkerbloom, San Diego horned lizard, short-joint beavertail cactus, southwestern willow flycatcher, summer tanager, vermilion flycatcher, Western yellow-billed cuckoo, yellow-breasted chat, and yellow warbler. In addition, the multi-agency conservation strategy incorporating protection on both public and private lands within reserves would be diminished for DWMAs and conservation areas with mixed land ownership. This would affect most species addressed by the plan.

2.3.6 Monitoring, Adaptive Management and Implementation

Implementation of this alternative would rely upon funds appropriated to BLM by Congress, and MOG mitigation fees. The implementing authority, citizens advisory group and scientific advisory board suggested for Alternative A would not be established. Future amendment of the conservation strategy would be available through amendment of the BLM's CDCA Plan only.

2.4 ALTERNATIVE C: TORTOISE RECOVERY PLAN

2.4.1 Overview

The Desert Tortoise (Mojave Population) Recovery Plan (Tortoise Recovery Plan) was adopted in 1994. Prepared for USFWS by a "Desert Tortoise Recovery Team," it presented a set of actions that the recovery team concluded were needed to recover tortoise populations. Although its recommendations are not binding on the agencies with jurisdictions over lands within desert tortoise habitat, the Recovery Plan's conservation strategy has served as a starting point in the process of developing conservation strategies for the West Mojave and other regional plans.

The USFWS is currently initiating a two-step review of the Recovery Plan. During 2003, a team assembled by USFWS will conduct an assessment of the plan in light of new information collected since 1994. If the assessment indicates that a revision of the Recovery Plan is warranted, that revision could occur during 2004.

The 1994 Tortoise Recovery Plan's strategy was relatively general (for example, the locations of recommended DWMAs were identified on regional maps but precise boundary identification was left to future planning). The interagency collaborative planning process that led to Alternative A used the Recovery Plan as a starting point, adding details and modifications based upon more recent data. Accordingly, Alternative C uses many of the more specific proposals of Alternative A to "flesh out" many of the relatively more general recommendations of the Tortoise Recovery Plan.

Alternative C combines the tortoise conservation strategy suggested by the Tortoise Recovery Plan with the conservation program developed by Alternative A for the Mohave ground squirrel and other sensitive plants and animals. All aspects of this alternative's conservation strategy would be as described for Alternative A, except as specifically described below. These include Alternative A's motorized vehicle access network and education outreach program. The West Mojave Plan would be a habitat conservation plan, and incidental take permits would be sought from CDFG and USFWS by local jurisdictions (see foldout Map 2-16).

2.4.2 Habitat Conservation Area

The HCA would consist of all lands proposed for HCA status by Alternative A, and include lands designated as tortoise critical habitat but excluded from Alternative A's DWMAs. Thus the HCA would include the four tortoise DWMAs, an MGS conservation area, and fourteen conservation areas established to conserve other sensitive plants, animals and their habitats. The Ord-Rodman DWMA would be designated as an ecological reserve and a Research Natural Area.

No tortoise Special Review Areas would be designated. Two Special Review Areas for the Little San Bernardino Mountains gilia would be designated, as in Alternative A.

BLM multiple use class changes would be as described for Alternative A (see Table 2-4), except changes from Unclassified, I and M to L would apply to the larger DWMA boundaries. There would be no additional class changes under this alternative.

2.4.3 Compensation Framework and Incidental Take Permits

The West Mojave Plan would serve as a habitat conservation plan, and incidental take permits would be sought from CDFG and USFWS by local jurisdictions. All compensation, fee and implementation structures proposed by Alternative A apply to this alternative, except as expressly noted in the discussion of species conservation measures (section 2.4.4, below).

2.4.4 Species Conservation Measures

Measures proposed for species other than the desert tortoise would be as described by Alternative A, including utility construction and maintenance measures for tortoises and the education program. Tortoise management actions under Alternative C follow.

2.4.4.1 Desert Tortoise Take-Avoidance Measures

The following desert tortoise take-avoidance measures would be adopted.

- (AC-1) Surface disturbance within DWMAs would be restored to pre-disturbance conditions (defined as the topography, soils, and native vegetation that exist in adjacent undisturbed or relatively undisturbed areas), closing access to non-designated vehicle routes and including restoring non-designated roadbeds to their pre-disturbance state.

- (AC-2) All competitive and organized events (including dual sport) would be prohibited within DWMAs.

- (AC-3) Parking and camping would be allowed within DWMAs in designated areas. Outside of DWMAs, parking and camping would be allowed within 300 feet from the centerline of motorized vehicle routes designated open.

- (AC-4) Tortoise DWMAs may provide forms of recreation compatible with tortoise recovery, including minimum impact recreation (e.g. hiking, equestrian uses, birdwatching, and photography).

- (AC-5) No discharge of firearms would be allowed within DWMAs, except for hunting of big game or upland game birds from September through February.

- (AC-6) Mining would be allowed on a case by case basis, provided cumulative impacts do not significantly impact tortoise habitats or populations, and effects would be mitigated during operation and land restored to pre-disturbance condition. Requirements that surface disturbance within DWMAs be restored to pre-disturbance conditions would apply to open pit mines and hard rock quarries. Mineral withdrawals identified by Alternative A (Afton

Canyon, acquired lands within the Carbonate Endemic Plants ACEC, Coolgardie Mesa and West Paradise Conservation Areas, and Rand Mountains) would be pursued.

- (AC-7) Vandalism should be halted, as should the collection and release of captive tortoises. Regular and frequent patrols by law enforcement personnel are essential

- (AC-8) Emergency measures would be developed to control unleashed dogs and dog packs.

- (AC-9) Initiate cleanup of surface toxic chemicals and unexploded ordinance. Identify and clean up unauthorized dumps in DWMAs. Reduce or eliminate use of authorized landfills and sewage ponds in and near DWMAs by predators of the desert tortoise (e.g., ravens and coyotes). Allow no new landfills or sewage ponds within DWMAs.

2.4.4.2 Desert Tortoise Survey and Disposition Protocols

The following management prescriptions would be adopted:

- (AC-10) Existing survey, handling and disposition requirements would continue. Presence-absence surveys and clearance surveys would be required in all areas prior to any new ground-disturbing activities.
- (AC-11) "No Survey" areas would not be delineated.
- (AC-12) A drop-off site would be established for unwanted captive tortoises at BLM's Barstow Way Station.
- (AC-13) Programs would be developed to promote use of unwanted desert tortoises for research and educational purposes.

2.4.4.3 Proactive Tortoise Management Programs

Desert Tortoise Fencing and Signing: (AC-14) Fence or otherwise establish effective barriers to tortoises along heavily traveled roads. Install culverts that allow underpass of tortoises to alleviate habitat fragmentation. Construct desert tortoise barrier fencing and underpasses along Highway 395, parts of Highway 58, the Randsburg-Mojave Road, the Red Rock - Randsburg Road, the Red Rock - Garlock Road, the railroad north and adjacent to Highway 58, Highway 247, Interstate 15, Fort Irwin Road, Manix Trail, Superior Lake [Copper City] Road, and the northern boundary of the Superior-Cronese DWMA. Construct highway underpases along Fort Irwin Road to allow desert tortoise movement and to facilitate genetic exchange.

(AC-15) Sign or fence DWMA boundaries adjacent to communities and settlements such as Barstow, the small settlements north of Barstow, Kramer Junction, California City, Cantil, Galileo Hill, Randsburg, Johannesburg, Atolia and Helendale, and other areas with conflicting uses.

(AC-16) Fence the periphery of the Superior-Cronese DWMA as needed to enforce regulations and protect desert tortoises from human impacts. Along the boundary with the Fremont-Kramer DWMA, a double row of desert tortoise barrier fencing may be necessary to prevent the spread of URTD into the Superior-Cronese DWMA.

(AC-17) Construct and maintain special fencing to protect desert tortoises from recreational vehicle use in the Johnson Valley Open Area and surrounding lands.

(AC-18) Sign boundaries of the Ord-Rodman DWMA in the vicinity of Barstow, Newberry Springs, Lucerne, Landers and Lucerne Valley.

Land Acquisition: (AC-19) The goal of the plan would be to acquire all private lands in DWMAs. Maintenance of the local tax base would not be a goal of the DWMA land acquisition program. Outside of DWMAs, acquisition priorities set by Alternative A would be followed; land acquisition would be from willing sellers only, and the acquisition program would seek to maintain the stability of the local tax base.

Raven Management: (AC-20) Reduce populations of the common raven to lessen predation on juvenile tortoises and ensure recruitment of juveniles into the subadult and adult populations.

Tortoise Translocation: (AC-21) Desert tortoises from adjacent lands should be experimentally translocated into DWMAs, such as from the El Mirage Open Area into the Fremont-Kramer DWMA and from the Johnson and Stoddard Valley Open Areas into the Ord-Rodman DWMA, to increase the density of desert tortoises and salvage breeding stock.

Headstarting: (AC-22) Initiate a semi-wild breeding program to rebuild and restore tortoise populations. The DTNA would be an ideal place to begin this program.

Administration: (AC-23) Each DWMA may require a reserve manager, additional staff, and law enforcement personnel; in some cases, the same staff may manage adjacent DWMAs. The formation of local advisory committees is encouraged. As funds become available, each DWMA or group of DWMAs should have an associated visitor center or set of interpretive sites and panels.

2.4.5 Public Land Livestock Grazing Program

(AC-24) The Ord-Rodman DWMA would be designated as a cattle grazing experimental management zone. Grazing management in this area would be as described for Alternative A. Elsewhere, livestock grazing would not be permitted within DWMAs.

2.4.6 Public Land Motorized Vehicle Access Network

This alternative is based on the assumption that tortoises thrive best where density of access routes is low, traffic is low and human access is limited. To achieve this:

- (AC-25) Alterative A's motorized vehicle access network would be adopted and implemented. Routes not designated open would be restored to their pre-disturbance condition. Limited speed travel would be allowed in tortoise DWMAs on designated signed roads. Implement closure of DWMAs to vehicular access with the exception of designated routes, including Federal, State and County maintained vehicle routes.

- (AC-26) Restrict the establishment of new roads in DWMAs.
- (AC-27) Implement emergency closures of dirt roads and routes as needed to reduce human access and disturbance in areas where human-caused mortality of tortoises is a problem.

2.4.7 Education Program

(AC-28) Construct a visitor education center at the DTNA that would include facilities for research as well as a drop-off site for unwanted captive desert tortoises. Develop programs to promote use of unwanted captives for research and educational purposes.

2.4.8 Monitoring, Adaptive Management and Implementation

Fund and implement monitoring studies identified for Alternative A, including those on BLM permanent study plots.

Establish a research program and focus research on the following topics:

- **Fremont-Kramer DWMA:** (AC-29) Desert tortoise diseases, including URTD; toxicosis; shell lesions; general health; nutritional status; food preferences and requirements; water balance and energy flow; predation by feral dogs and other mammalian predators; raven predation; habitat restoration; the effectiveness of desert tortoise-proof fencing and culverts in eliminating road kills; interactions of desert tortoises with urban barrier fencing; protective barriers between urban development and open desert; and effects of mining, domestic sheep and cattle grazing, noise/vibrations, and cumulative impacts on mortality and survivorship.
- **Superior-Cronese DWMA:** (AC-30) Epidemiology of URTD and other diseases; physiological, ecological, nutritional, and behavioral requirements of hatchling and juvenile desert tortoises; nutritional qualities of preferred food plants; habitat restoration; and characteristics of undisturbed desert tortoise habitat. Continue using the latest medical techniques to assess the health of desert tortoises. Conduct epidemiological surveys to determine the distribution and frequency of desert tortoises with URTD and other diseases. These surveys would be used to help determine if fencing is necessary within the DWMA or between the Fremont-Kramer DWMA and the Superior-Cronese DWMA.
- **Ord-Rodman DWMA:** (AC-31) Disease epidemiology; the effects of ravens and other predators on desert tortoise populations; and the effects of hunting of upland birds, big game, and furbearers on desert tortoises and their habitat.

2.5 ALTERNATIVE D: ENHANCED ECOSYSTEM PROTECTION

2.5.1 Overview

Alternative D's conservation strategy grew out of discussions among the participating agencies and members of the public during EIR/S scoping and the development of Alternative A. Many suggestions were offered that called for placing a very high priority on the conservation of natural communities and ecosystems, even if adoption of these recommendations would limit human access to and multiple use of the western Mojave Desert. Alternative D presents a conservation strategy that incorporates many of these suggestions (see foldout Map 2-17).

All aspects of this alternative's conservation strategy would be as described for Alternative A, except as specifically described below. These include Alternative A's motorized vehicle access network and education outreach.

2.5.2 Habitat Conservation Area

(AD-1) The Fremont – Kramer DWMA would be reconfigured to encompass existing critical habitat between Shadow Mountain Road and Edwards Air Force Base west of the El Mirage Open Area, as in the revised Alternative A. This DWMA would also be expanded northwest of Kramer Junction so that its boundary followed the boundary between Kern and San Bernardino Counties.

(AD-2) The Mohave ground squirrel conservation area would be the same as Alternative A. The MGS conservation area would be designated by the BLM as an ACEC.

(AD-3) All BLM multiple use class I, M and U lands within the HCA would be changed to class L. All lands removed from the LTA disposal zone within the HCA would be reclassified from U and M to L. This would apply to the DWMAs, all conservation areas and ACECs listed in Table 2-4, but would not apply to scattered BLM parcels in the San Gabriel Mountains foothills and within the Los Angeles County SEAs (Table 2-4). The lands adjoining Joshua Tree National Park containing Little San Bernardino Mountains gilia habitat would change from U to M, and the other MUC changes in Table 2-4 would remain as in Alternative A.

2.5.3 Compensation Framework

(AD-4) The mitigation fee would be based on a compensation ratio that would include a conservation bonus value for projects located in two or more overlapping conservation areas. In the event that a project was to be located on lands within two overlapping conservation areas (such as portion of the Fremont – Kramer DWMA and the MGS Conservation Area, or the Ord-Rodman DWMA and the Mojave Monkeyflower Conservation area), the compensation ratio, normally 5:1 in the HCA, would be raised to 6:1. In the event that a project was located on lands within three overlapping conservation areas (such as lands within the Barstow Woolly Sunflower Conservation Area, the MGS Conservation Area, and the Fremont-Kramer DWMA), the compensation ratio

would be raised to 7:1. These additive compensation ratio areas are depicted on foldout Map 2-17. There are no lands within more than three overlapping conservation areas; thus, the 7:1 ratio would be the planning area's highest.

(AD-5) The West Mojave Plan would not include a Habitat Credit Component. A program to restore habitats within the HCA would be developed by the Implementation Team.

2.5.4 Species Conservation Measures

Desert Tortoise Take-Avoidance Measures: (AD-6) Within DWMAs, motorized vehicle stopping and parking would be allowed within 15 feet of the centerline of the designated route. Camping would be allowed only in designated areas. Where numerous scattered campsites occur in a particular area, BLM would consolidate them into a designated BLM campground. Educational materials could be disseminated from these established BLM campgrounds.

(AD-7) On public lands within DWMAs, general shooting other than hunting would not be allowed. No target shooting would be permitted.

(AD-8) New ground disturbance caused by mining exploration activities would have to be restored (rather than reclaimed). New linear utility projects would be required to include erosion control protections and re-vegetation in all areas. Level 1 BMPs would be applied in both DWMAs and elsewhere within the tortoise survey area (rather than applying Level 2 BMPs outside of DWMAs).

(AD-9) On public lands within tortoise DWMAs, the following restrictions would apply:

- No new agriculture, particularly biosolids fields in DWMAs
- No new development of nuclear and fossil fuel power plants in DWMAs
- All new routes in DWMAs would be considered in the context of Class L guidelines
- All recreational events would be restricted to "approved" routes of travel (not "existing" routes, as given for Class M)
- No pit, start, finish, or spectator areas allowed in DWMAs
- No competitive events would be allowed in DWMAs
- No dual-sport events would be allowed in DWMAs

(AD-10) Outside of DWMAs, current fire management practices would continue. To the degree possible and only if consistent with ensuring public safety, the use of heavy equipment and excessive ground disturbance within the HCA would be avoided. The brochure developed for filming activities (or a similar one) would be circulated to fire fighting personnel to identify DWMAs and areas having higher than average tortoise densities. In addition, except where necessary to address threats to developed property or human safety, the following guidelines for fire management would apply within tortoise DWMAs:

- In identified higher density areas, all fire fighting activities would be restricted to approved routes of travel; use of "closed" routes that have not been rehabilitated would be allowed (use of rehabilitated routes would not be allowed)
- No new roads would be created in areas having higher than average tortoise densities; approved routes may be widened as needed to serve as fire-breaks
- In general, fires in higher density areas would be allowed to burn, contained within existing roads, and result in as little habitat disturbance as feasible
- All burn areas in DWMAs would be quarantined from future use until which time a reduced network is identified to allow for public access, which would curtail additional habitat degradation and promote natural rehabilitation; the BLM, working with the Implementation Team, would determine when approved routes of travel would again be available for full use

Desert Tortoise Proactive Management Programs: (AD-11) In addition to the fencing proposals suggested by Alternative A, the following additional measures would be taken.

- The Mojave-Randsburg Road should be fenced from Highway 395 to the western boundary of the Fremont-Kramer DWMA.
- If average daily traffic warrants in the future, the Shadow Mountain Road should be fenced.
- Underpasses beneath the Fort Irwin Road should be installed.
- Fencing should be installed along the north side of the Pinto DWMA, using chain link if needed to prevent urban encroachment.
- The periphery of the Superior-Cronese DWMA should be fenced, as needed.
- At the time it is paved, a tortoise barrier fence and appropriately spaced culverts would be installed along both sides of Helendale Road between Silver Lakes and Highway 58, to prevent road from fragmenting high density tortoise areas habitat.

(AD-12) In many instances, the location of major improvement projects for highways listed above may be known years in advance of construction. Highways may be fenced years in advance of construction, and treated as a banked mitigation measure, worth an amount of credit to be determined in consultation with the Implementation Team. The cost could be calculated and recorded, and that amount "banked" (deducted from) against the cost of future mitigation, such as cost of land acquisition.

(AD-13) The long-term land acquisition goal would be to acquire all private lands within the DWMA, from willing sellers.

(AD-14) The funding and implementation priority of the tortoise disease management program suggested by Alternative A would be raised from low to high.

(AD-15) Experimental management zones would be established in the Brisbane Valley and Copper Mountain Mesa to study the effects of sheep grazing, off highway vehicle use and urbanization on tortoises.

(AD-16) Tortoise headstarting should be pursued as discussed in Alternative A, except the effort should not begin with a pilot program. Rather, at least five sites should be established within three years of plan adoption.

Desert Tortoise Translocation: (AD-17) Except as described in the Tortoise Disposition Protocol, do not mass-translocate tortoises into DWMAs. Mass translocation may serve as an adaptive management tool if clear scientific-based protocols are developed and endorsed by appropriate entities (such as the MOG).

(AD-18) Brisbane Valley and public lands north of Joshua Tree National Park would serve as potential translocation sites for unexpectedly large numbers of wild tortoises that are removed from construction sites authorized by the West Mojave Plan.

(AD-19) Allow translocation or other rescue of tortoises from military maneuver areas. To this end, complete a pilot translocation study to determine the efficacy of relocating healthy desert tortoises. Use results of the pilot translocation study to determine the best placement and use of removed tortoises. Some goals of the pilot study include:

- Determine the efficacy of translocation;
- Assess translocation as a possible tool for tortoise recovery;
- Use any animals tested positive for upper respiratory tract disease to further our understanding of the disease; and
- Possibly use animals to study the efficacy of the head-starting program.

Translocation site(s) (i) should be fenced; (ii) have conflicting land uses eliminated; (iii) occur on public lands even if that means purchasing private lands; (iv) be isolated from and not contiguous to reserve areas; and (v) receive only healthy tortoises that test negative for upper respiratory tract disease.

Mohave Ground Squirrel: (AD-20) Programmatic surveys in potential habitat areas would be conducted to develop a better MGS range map. Areas to be surveyed would include Brisbane Valley and the Ord-Rodman DWMA (especially it's southern portion). If "source areas" for MGS were to be identified in the future, site-specific mineral withdrawals of these areas would be considered.

Other Species: (AD-21) Grazing exclosures would be established to monitor habitat of the yellow-eared pocket mouse, Ninemile Canyon phacelia and Charlotte's phacelia in the eastern Sierra canyons.

(AD-22) Burrowing owl surveys would be required of all project sites.

(AD-23) To protect the gray vireo, the San Diego horned lizard and the short-joint beavertail cactus, flood control improvements would be restricted in washes that drain the San Gabriel and San Bernardino Mountains. In Los Angeles County, these include Grandview Canyon, Boneyard Canyon, Banneret Canyon, La Montaine Creek, Puzzle Canyon, Jesus Canyon, and Mescal Creek. In San Bernardino County, they include Sheep Creek, one unnamed tributary west of

Sheep Creek, Horse Canyon, Manzanita Wash, Oro Grande Wash and twelve unnamed tributaries between the Los Angeles County line and Interstate 15, and Telephone Canyon and an additional eleven unnamed tributaries east of Interstate 15 to the Mojave River. A one hundred foot buffer would be established.

(AD-24) All lands within the Carbonate Endemic Plants ACEC would be withdrawn from mineral entry, including acquired lands. All public lands would be changed from multiple use class M to class L.

(AD-25) To protect Charlotte's phacelia and Ninemile Canyon phacelia,, cattle grazing on the slopes of the eastern Sierra Nevada Mountains would be restricted in known habitat to the July 1 to April 1 time periods.

(AD-26) The multiple use class of lands south of the Cady Mountains would be changed from class M to class L.

2.5.5 Public Land Livestock Grazing Program

The livestock grazing program proposed by Alternative A would be implemented, except as expressly modified below.

- (AD-27) Fund Avery-Ivanpah study in three DWMA allotments (Harper, Ord, and Cronese) to determine the appropriateness of the 230 lbs / acre threshold; until that determination is scientifically made, use a threshold of 350 lbs / acre.

- (AD-28) Rather than March 15, remove cattle by February 15 of each year (as per other prescriptions) to benefit neonatal foraging.

- (AD-29) Prevent any further damage to identified riparian areas on all cattle allotments managed by the BLM.

- (AD-30) Take an aggressive look at the best placements of waters to facilitate other measures (i.e., establishing the Exclusion Zones, etc.) and minimize impacts to all covered species.

- (AD-31) Minimize OHV impacts on cattle in the Ord Mountain Allotment.

- (AD-32) Throughout the MGS conservation area, maintain 350 lbs/acre for sheep grazing until scientific studies demonstrate a non-competitive threshold. No sheep grazing would be allowed in this area after May 15.

2.5.6 Public Land Motorized Vehicle Access Network

The motorized vehicle access network proposed for Alternative A would be implemented under Alternative D.

(AD-33) Additional motorized vehicle access restrictions would be imposed in several of the motorized access zones within the DWMAs. Within biologically sensitive MAZ's, only street-legal vehicles (i.e. licensed by the California Department of Motor Vehicles in accordance with the State Vehicular Code as legal for operation on California's public roads and highways) would be permitted. These include street-legal four-wheel drive vehicles and dual-sport motorcycles. Vehicles that are not street-legal but are only eligible for "green sticker" licensing (that is, approved for use off of highways) would be prohibited. These include many types of dune buggies, sand rails, all terrain vehicles, quads and dirt bikes. The restricted MAZ's would are listed in Table 2-29.

Table 2-29
Motorized Access ZonesLimited to Street-Legal Vehicles Only

SUBREGION OR SPECIAL MANAGEMENT AREA	MOTORIZED ACCESS ZONE	REASONS FOR VEHICLE RESTRICTIONS
El Mirage	1,2	Total Corrected Sign for desert tortoise significantly above average; would help to address long-standing private property conflict issues
Kramer	1	Total Corrected Sign for desert tortoise significantly above average; would assist in addressing urban interface issues (i.e. Silver Lakes)
Kramer	2,3,4	Total Corrected Sign for desert tortoise significantly above average
Fremont	1,2,5	Total Corrected Sign for desert tortoise significantly above average
Superior	1	Total Corrected Sign for desert tortoise significantly above average; closure would help address significant law enforcement issues
Superior	3	Total Corrected Sign for desert tortoise significantly above average
Superior	4	Total Corrected Sign for desert tortoise significantly above average; offers protection to Paradise Valley which was withdrawn from the military as a possible expansion area
Superior	5	Total Corrected Sign for desert tortoise significantly above average; offers further protection for the Lane Mountain milkvetch
Newberry Rodman	3	Total Corrected Sign for desert tortoise significantly above average; conflicts with permitted ranching operation
Coyote	1	Total Corrected Sign for desert tortoise significantly above average (Offers protection to Paradise Valley)
Western Rand ACEC	---	Important tortoise habitat, adjacent to Desert Tortoise Research Natural Area

(AD-34) The CDCA Plan access corridor connecting the Stoddard Valley Open Area and the Johnson Valley Open Area would be deleted.

(AD-35) During periods of prolonged drought (lasting three or more years), the BLM would consider emergency route closures (generally referred to as "quarantine areas") in higher density areas, or identified motorized access zones. Such quarantines would be lifted immediately following break of the drought, which would be identified by the Implementation Team in coordination with BLM, USFWS, and CDFG.

2.6 ALTERNATIVE E: ONE DWMA – ENHANCED RECREATION OPPORTUNITIES

2.6.1 Overview

Alternative E's conservation strategy, like Alternative D's, grew out of discussions among the participating agencies and members of the public during EIR/S scoping and the development of Alternative A. Many suggestions were offered that called for placing a very high priority on multiple use and motorized vehicle access to the desert, even if this might affect some of the programs that could be implemented to conserve of species and ecosystems. These included scoping meeting requests that the EIR/S explore whether a single DWMA, protecting only the remaining areas of relatively higher tortoise populations, might be effective in conserving the desert tortoise. Alternative E presents a conservation strategy that incorporates many of these suggestions (see foldout Map 2-19).

Alternative E is intended to implement a tortoise management strategy that emphasizes a very aggressive ecosystem conservation program within the single DWMA, comparable to that proposed by Alternative D. Outside of this area, a program would be implemented that emphasizes multiple use, with special emphasis given to enhancing recreation opportunities.

All aspects of this alternative's conservation strategy would be as described for Alternative A, except as specifically described below. These include Alternative A's motorized vehicle access network, education, feral dog management plan and disease management trust fund.

2.6.2 Habitat Conservation Area

(AE-1) A single DWMA would be established, encompassing approximately 1,118 square miles and including portions of Alternative A's Superior-Cronese and Fremont-Kramer DWMA. This DWMA would exclude the Pinto Mountains, the Ord and Rodman Mountains, lands north and west of Kramer Junction, and lands south of Shadow Mountain Road. Within this DWMA, the tortoise conservation measures proposed by Alternative D would apply, except where specifically noted below. No tortoise Special Review Areas would be designated but the gilia SRAs would remain.

(AE-2) All BLM multiple use class M and U lands within the DWMA would be changed to class L. Lands within the DWMA removed from the LTA disposal zone would be changed from multiple use class U to L. All other multiple use class changes for ACECs and conservation areas outside the DWMA would be as described in Alternative A and Table 2-4.

Boundaries of conservation areas for the Mohave ground squirrel and other species would be established as proposed for Alternative A, except for the removal of the Spangler Hills Open Area expansion from the MGS Conservation Area.

2.6.3 Compensation Framework

(AE-3) Single-family residential structures within the HCA but outside of the tortoise DWMA would be exempt from the mitigation fee. The fee would apply to single-family residential structures within the DWMA.

2.6.4 Recreation Program

Alternative E proposes a number of measures that would enhance recreation opportunities within the western Mojave Desert. These are described below:

- (AE-4) Expand the Spangler Hills Open Area to include lands to the southwest between Highway 395 and the Trona Road. Change the BLM multiple use class to Class I within this area. The competitive "C" routes would be reopened.

- (AE-5) Expand the Johnson Valley Open Area westward to include the Cinnamon Hills. Change the BLM multiple use class to Class I within this area.

- (AE-6) Establish a Fremont Recreation Area on lands north and west of Fremont Peak, surrounding Cuddeback Dry Lake. Change the BLM multiple use class to Class M within this area. Allow competitive off highway vehicle speed events within this area on designated motorized vehicle routes. Prepare a management plan for this area that emphasizes vehicle access, camping, and competitive event support. A denser network of off highway vehicle routes than that proposed by Alternative A could be established in this area close to Cuddeback Dry Lake.

- (AE-7) Establish a corridor specifically for enduro events that runs from the El Mirage Open Area, to and past the Fremont Recreation Area, and ends at the Spangler Hills Open Area.

- (AE-8) Competitive motorized recreation events would be allowed between Shadow Mountain Road and the El Mirage Open Area.

- (AE-9) "Yellow flag" restrictions for competitive events would apply only within the single DWMA.

2.6.5 Species Conservation Measures

Desert Tortoise: (AE-11) All public lands within the single tortoise DWMAs would be reclassified as Category I habitat. All public lands outside of the DWMA would be reclassified as Category III habitat.

(AE-12) Within the DWMA, the following activities would be prohibited:

- All competitive and organized off highway vehicle events (including dual sport) within the DWMA, except for enduros along the proposed enduro corridor.
- Commercial filming
- Shooting and hunting

(AE-13) Outside of the DWMA, the commercial filming program described by Alternative A would be implemented.

(AE-14) The stopping, parking and camping changes proposed by Alternative A would apply only within the single tortoise DWMA.

(AE-15) Acquisition priorities would be highest for lands within the DWMA. However, there would be no net loss of acreage of private lands within the planning area.

(AE-16) Fencing priorities would be the same as for Alternative A, except that special attention would be given to ensure that these fences do not restrict off highway vehicle recreation opportunities. Fence the periphery of the DWMA, as needed.

(AE-17) The fire management program described for Alternative D would be applied within the DWMA.

(AE-18) Implement the headstarting program described by Alternative A, subject to the following modifications. Locate all facilities within the DWMA in places where tortoises have apparently been extirpated. Collect gravid females from adjacent areas, not within the DWMA.

(AE-19) If authorized construction project displaces tortoises within two miles of the DWMA, consider translocating them into the nearest portion of the DWMA.

(AE-20) Except as described in the Tortoise Disposition Protocol, do not mass-translocate tortoises into the DWMA. Mass translocation may serve as an adaptive management tool if clear scientific-based protocols are developed and endorsed by appropriate entities (such as the MOG).

(AE-21) A minimum of 2 new law enforcement and 2 new maintenance workers would be assigned to the DWMA, dedicated full-time to natural resources enforcement and implementation work

2.6.6 Public Land Livestock Grazing Program

(AE-22) The program would be the same as proposed for Alternative A, except there would be no seasonal restriction (i.e., May 15) or utilization threshold (i.e., 230 lbs/acre) on cattle or sheep allotments. The Harper Lake Allotment and the Cronese Lakes Allotment coincide with the single DWMA. All portions of allotments within the DWMA would no longer be available for grazing.

(AE-23) Sheep grazing would not be eliminated from public lands between Shadow Mountain Road and the northern, fenced boundary of the El Mirage Open Area.

2.7 ALTERNATIVE F: NO DWMA – AGGRESSIVE DISEASE AND RAVEN MANAGEMENT

2.7.1 Overview

Alternative F's conservation strategy differs from that of the previously discussed alternatives, in that it proposes a tortoise conservation strategy that relies on an aggressive program of tortoise disease management and raven control, supported by limited fencing, rather than the establishment of DWMAs to protect tortoise habitat. Thus the highest funding priority would be given to controlling disease and ravens, and no DWMAs would be designated (see foldout Map 2-21).

All aspects of this alternative's conservation strategy would be as described for Alternative A, except as specifically described below. These include Alternative A's motorized vehicle access network, livestock grazing program and education outreach.

2.7.2 Habitat Conservation Area

(AF-1) A 1.3 million acre habitat conservation area would be established that would consist only of the MGS Conservation Area and the 14 conservation areas proposed for other species by Alternative A. No DWMAs would be established, nor would DWMA ACECs be designated. Although no DWMAs would be delineated, BLM's Category I, II and III tortoise habitat designations and USFWS critical habitat would remain in effect. Changes to the Category I habitat in the Rand Mountains ACEC would be implemented.

(AF-2) Tortoise Special Review Areas would not be designated; however, the two Little San Bernardino Mountains gilia SRAs would be designated.

(AF-3) BLM multiple use class M lands would change to class L in the northern portion of the MGS Conservation Area. All other MUC changes shown on Table 2-4, with the exception of MUC changes in DWMAs, would be as described for Alternative A.

2.7.3 Compensation Framework

(AF-4) The compensation framework would be as described for Alternative A, although the area within which the 5:1 compensation ratio would apply would change. Under this alternative, the 5:1 ratio would be in effect within the HCA, and on all desert tortoise critical habitat located outside the HCA.

(AF-5) The 1 percent allowable ground disturbance threshold would not apply, either within or outside the HCA. There would be no habitat credit component program.

2.7.4 Species Conservation Measures

Tortoise Take-Avoidance Measures: (AF-6) Restoration and reclamation programs could continue, although there would be no habitat credit program.

(AF-7) Motorized vehicle speed events would be allowed on a case-by-case basis. An environmental assessment would be prepared for each event. On BLM public lands designated as "limited areas", motorized vehicle camping, stopping and parking on public lands would be allowed within 100 feet of designated open routes on BLM multiple use class L lands, and within 300 feet elsewhere.

(AF-8) Land acquisition would be guided by current BLM and Department of Defense acquisition priorities set by the BLM – EAFB land tenure adjustment strategy. This "LTA" strategy identified lands for disposal (Disposal Zone) while maintaining other lands (Retention and Consolidation Zones), the latter being located primarily in an L-shaped pattern running from north of Adelanto, to the Fremont Peak region, and then east through Superior Valley.

(AF-9) Mineral extraction and material sales would be allowed in all areas. BLM Plans of Operation would be required on multiple use class L and existing ACEC lands. Reclamation would be required, although restoration would not. Mines less than ten acres located on BLM lands would continue to be covered by the existing small mining biological opinion. SMARA regulations would be implemented by local jurisdictions and the BLM.

(AF-10) In tortoise Category I and II habitat, dogs off leash under the control of their owners would be allowed except where prohibited.

(AF-11) Caltrans highway proposals would be considered on a case-by-case basis.

(AF-12) Law enforcement and BLM ranger patrols would continue at current levels. There would be no new law enforcement personnel.

(AF-13) New utility construction and maintenance measures for tortoises would be addressed on a case-by-case basis. Maintenance measures would continue to follow existing procedures.

(AF-14) Streamlined Level 1 BMPs would apply within Category I and Category II tortoise habitat. Level 2 BMPs would apply elsewhere.

Tortoise Fencing Program: (AF-15) Require immediate fencing along the following roads, in decreasing order of priority: all of Highway 395 between Adelanto and Red Mountain; all of Highway 58 between Highway 14 and Barstow; all of Highway 247 between Barstow and Lucerne Valley; all of Interstate 40 between Barstow and Ludlow; and all secondary roads adjacent to tortoise habitat: Shadow Mountain Road, Fort Irwin Road, Irwin Road, recently paved portions of Twenty Mule Team Road, and Garlock Road.

Tortoise Survey and Disposition Protocols: (AF-16) Presence-absence survey would be required in all areas, and clearance surveys would be required where tortoise sign is found. "No Survey" areas would not be designated.

Tortoise Headstarting and Translocation: (AF-17) There would be no headstarting program, nor would there be the establishment of formal translocation areas. The Implementation Team would assist project proponents, as needed, to rescue tortoises from harn's way on BLM-authorized projects.

Tortoise Disease Management and Raven Control: (AF-18) The disease and raven programs proposed by Alternative A would be implemented under this alternative. Funding these programs would receive the highest priority. All other tortoise management programs, including habitat enhancement, reclamation, land acquisition, headstarting, weed management and other actions, would be funded only to the degree that moneys were available after full funding of the disease and raven control programs. If necessary, institute emergency culvert closure.

Other Species: (AF-19) LeConte's thrasher conservation would rely on lands protected by the MGS and other species conservation areas. No compensation or avoidance requirements would be imposed for the take of burrowing owl (though mortality is prohibited by state law), alkali wetland plants, Little San Bernardino Mountains gilia and crucifixion thorn.

2.7.5 Public Land Livestock Grazing Program

(AF-20) Livestock grazing would be managed pursuant to the existing USFWS biological opinions and current BLM CDCA Plan management. Sheep would continue to be precluded from grazing in tortoise Category I and II habitat.

2.8 ALTERNATIVE G: NO ACTION

2.8.1 Overview

Alternative G assumes the continued implementation, over the next 30 years, of existing approaches to the conservation of sensitive plants and animals as expressed in current provisions of agency and jurisdiction land use plans, ordinances, statutes and policies. Current procedures for complying with the California and federal endangered species acts would remain in effect, including case-by-case permitting under FESA and CESA. These programs are discussed in detail in Chapter 3, Section 3.1 (Planning and Regulatory Framework), and in the *Current Management Situation of Special Status Species in the West Mojave Planning Area* (a copy of which is included on the attached CD-Rom).

2.8.2 Habitat Conservation Area

No new conservation areas would be designated for the tortoise, nor would new conservation areas be established for other sensitive species. The DTNA would remain as the only area exclusively designated for tortoise management in the West Mojave. BLM management on

public lands would be directed by management goals of Category I, II, and III, Multiple Use Guidelines given in the CDCA Plan, USFWS-designated critical habitat, and other applicable regulations (i.e., FLMPA, FESA, etc.). Many of these same regulations would also apply to management of private lands, and CESA would apply.

No changes would be made to the Land Tenure Adjustment program.

Species within cities and counties would continue to be managed under general plans and other applicable regulations (i.e., SMARA, Streambed Alteration Agreements, CEQA). There would be no Special Review Areas. The Mojave Basin Adjudication would remain in effect.

2.8.3 Compensation Framework

The tortoise compensation framework would still follow the MOG formula. Although this formula is ostensibly applicable to public lands only, it has been (and would continue to be) applied to private lands as well, and is driven by the proximity of private lands to Category I, II, and III. Therefore, compensation ratios would remain at between 1:1 (on and adjacent to Category III Habitat) and up to 6:1 (on Category I Habitat). CDFG would continue to require trapping for Mohave ground squirrel, and CDFG's existing fee program for MGS would continue. The compensation framework, new ground disturbance limits and habitat credit component proposed by Alternative A would not apply.

2.8.4 Incidental Take Permits

Incidental take authorization (federal Section 10(a) and State 2081 permits) would continue to be sought on private lands where tortoise sign is found during presence-absence surveys. Projects with a federal nexus would continue to be authorized under Section 7 of FESA, and result in formal (i.e., issuance of biological opinions) and informal consultations.

2.8.5 Species Conservation Measures

- **Desert Tortoise:** There would be no specific, new conservation measures or areas applied to tortoise protection. The DTNA would remain as the single place where management for tortoise conservation would be applied.

- **Mohave Ground Squirrel:** No new measures would be identified relative to MGS conservation. Management would continue to be applied on private lands, but would not significantly affect management on public lands, except as provided for under CDCA guidelines and an MOU established between the BLM and CDFG.

Other Species: Carbonate Habitat Management Strategy would apply after a separate biological opinion. Take of burrowing owls would be determined on a case-by-case basis. No killing of owls would be allowed, as at present. Species found primarily on private lands (alkali mariposa lily, gray vireo, Little San Bernardino Mountains gilia, Parish's alkali grass, Parish's popcorn flower, San Diego horned lizard, and short-joint beavertail cactus) would receive case-by-

case review under CEQA. Species dependent on groundwater levels in the Mojave River would continue to be governed by local ordinances, wetland laws and application of the Mojave Basin Adjudication.

2.8.6 Public Land Livestock Grazing Program

If Alternative G (No Action) is adopted, the National Fallback Standards and Guidelines will be adopted for the Western Mojave Desert portion of the BLM's California Desert District.

2.8.6.1 Objective A - Implement Standards

Manage grazing activities under the National Fallback Standards:

- *Soils.* Upland soils exhibit infiltration and permeability rates that are appropriate to the soil type, climate, and landform.
- *Riparian/Wetland.* Riparian-wetland areas are in properly functioning condition.
- *Stream Function.* Stream channel morphology (including but not limited to gradient, width/depth ratio, channel roughness and sinuosity) and functions are appropriate for the climate and landform.
- *Native Species.* Healthy, productive, and diverse populations of native species exist and are maintained.

2.8.6.2 Objective B – Conform Grazing Activities

Manage grazing activities under the following fallback guidelines:

- Management practices maintain or promote adequate amounts of ground cover to support infiltration, maintain soil moisture, and stabilize soils.
- Management practices maintain or promote soil conditions that support permeability rate that are appropriate to climate and soils.
- Management practices maintain or promote sufficient residual vegetation to maintain, improve, or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge and stream bank stability.
- Management practices maintain or promote stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions that are appropriate to climate and landform.
- Management practices maintain or promote the appropriate kinds and amounts of soil organisms, plants and animals to support the hydrologic cycle, nutrient cycle, and energy flow.

- Management practices maintain or promote the physical and biological conditions necessary to sustain native populations and communities.

- Desired species are being allowed to complete seed dissemination in one out of every three years (Management actions will promote the opportunity for seedling establishment when climatic conditions and space allow.)

- Conservation of Federal threatened or endangered, Proposed, Category 1 and 2 candidate, and other special status species is promoted by restoration and maintenance of their habitats.

- Native species are emphasized in the support of ecological function.

- Non-native plant species are used only in those situations in which native species are not readily available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.

- Periods of rest from disturbance or livestock use during times of critical plant growth or regrowth are provided when needed to achieve healthy, properly functioning conditions (The timing and duration of use periods will be determined by the authorized officer).

- Continuous, season-long livestock use is allowed to occur only when it has been demonstrated to be consistent with achieving healthy, properly functioning ecosystems.

- Facilities are located away from riparian-wetland areas wherever they conflict with achieving or maintaining riparian-wetland function.

- The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions and processes of those sites.

- Grazing on designated ephemeral (annual and perennial) rangeland is allowed to occur only if reliable estimates of production have been made, an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and adverse effects on perennial species are avoided.

2.8.7 Public Land Motorized Vehicle Access Network

Off road vehicle designations in the West Mojave planning area would remain unchanged from those adopted by the BLM on June 30, 2003. Motorized vehicle networks developed during the preparation of ACEC management plans since 1980 would provide the network that would apply within those ACECs, except as specifically modified by the June 30, 2003 Decision Record. These include the following ACECs: Afton Canyon, Barstow Woolly Sunflower, Bedrock Spring, Big Morongo Canyon, Black Mountain, Calico Mountain Early Man Site, Christmas Canyon, Cronese Basin, Desert Tortoise Research Natural Area, Fossil Falls, Great Falls Basin, Harper Dry Lake, Jawbone/ Butterbredt, Juniper Flats, Last Chance Canyon, Mojave Fishhook Cactus, Rainbow Basin Natural Area, Red Mountain Spring (formerly Squaw Spring), Rodman Mountains Cultural

Area, Rose Spring, Sand Canyon, Short Canyon, Soggy Dry Lake, Steam Well, Trona Pinnacles, Upper Johnson Valley, Western Rand Mountains, and Whitewater Canyon.

Within the redesign area, the network adopted on June 30, 2003 would be retained. This would include the Juniper subregion network that Alternative A proposes to replace. In all other areas, the 1985-87 off road vehicle designations (as modified by the June 30, 2003 decision) would remain in place.

2.8.8 Education Program

Current programs implemented by the BLM, cities and counties would continue, including public volunteer efforts, outreach programs, media contacts, visitor field contacts and patrols by law enforcement personnel.

2.9 ALTERNATIVES EVALUATED BUT ELIMINATED FROM DETAILED CONSIDERATION

An environmental impact statement is required to rigorously explore and objectively evaluate all reasonable alternatives. The range of reasonable alternatives is limited by legal requirements and the requirements to fulfill the purpose and need described in Chapter One. The following alternatives were evaluated and eliminated from detailed consideration. These alternatives were eliminated because they did not meet the purpose and need for the West Mojave Plan or the CDCA Plan, did not meet certain legal requirements of FLPMA, or were variations of alternatives already being studied in detail through this environmental impact statement process.

Route Designation Mileage Ceiling Alternative: During the task group process, it was suggested that the mileage of a final motorized vehicle access network be capped at 18 miles per township in desert tortoise Category I habitat, and 24 miles per township in desert tortoise Category II habitat. This alternative was not considered in detail due to the arbitrary nature of these figures, neither of which had any basis in either the Desert Tortoise Recovery Plan or the scientific literature. Instead, the route network design was grounded in factors having a demonstrated connection to habitat needs, such as avoiding washes and areas of relatively high tortoise density, elevation and slope considerations, sensitivity of other species, elimination of redundant routes and type of vehicle use, as well as recreational, commercial and landowner access needs.

Interim Management Alternative: As a result of a January 2001 consent decree commitment on a settlement agreement arising out of litigation between BLM and the Center for Biological Diversity and others, the BLM was required to "implement an emergency route closure" for the Red Mountain, Fremont, Kramer, Superior and Newberry-Rodman subregions This measure was to remain in effect until the issuance of the West Mojave Plan Record of Decision. BLM implemented this measure by adopting route closures, based upon the preliminary and relatively incomplete information available at that time.

The closures were identified before the field survey work described above was completed, at a time when the route designation planning process was still at a relatively early stage. Prior to

March 2002, the results of this field survey were not available to help identify the location of routes of travel on the ground, the nature of those routes (graded, 4WD, single track, level of use), and vehicle destination points (campgrounds, staging areas, popular recreation sites, and other features). The field survey revealed that nearly nine percent of the routes left open by the interim closures do not exist on the ground. The field survey also indicates that the design of the resulting access network did not provide for all motorized vehicle access needs, nor for the most effective protection for species of concern.

Core Area Alternative: An approach suggested for reserve design was to identify DWMA boundaries, and then designate the most biologically sensitive or important portions of those DWMAs as "core areas," which would receive relatively higher priority for funding and implementation. This alternative was eliminated because it was concluded that all portions of the DWMA are equally critical for tortoise recovery, and that identifying higher priority "core areas" necessarily demoted the remainder of the DWMA to a low priority zone that, given limited funding, might see little in the way of implementation in the future. This could heighten the risk that habitat between the "core areas" would degrade, thereby fragmenting the DWMAs.

Barstow to Vegas Race Course Alternative: A proposal was suggested to re-route the West Mojave segment of the Barstow to Vegas Race Course to avoid sensitive resources. The start cone was to be relocated from the Alvord Road area to the Johnson Valley Open area, and the re-routed race course was to proceed northwest to the Pisgah Crater area, cross I-40, wind through the Cady Mountains area, cross I-15, and join the existing Barstow to Vegas Race Course near the Soda Mountains. This alternative was eliminated because in December 2002, the BLM's Record of Decision for its Northern and Eastern Mojave Plan eliminated the eastern three-quarters of the Barstow to Vegas Race Course. Lacking a route to connect to east of the Soda Mountains, a re-routed, but stand-alone, western segment would be an abbreviated route that would end with its eastern terminus well short of its intended destination, the State of Nevada. Accordingly, it was eliminated from detailed consideration.

Listed Species Only Alternative: The CDFG suggested consideration of an alternative addressing only those species designated as rare, threatened or endangered under state and federal laws. This alternative would not meet BLM and local jurisdiction objectives to conserve species that may be listed in the future. Moreover, because the West Mojave Plan is a federal land use plan amendment, as well as a habitat conservation plan, a listed species only alternative would not meet federal policies requiring the conservation of non-listed but sensitive species on public lands.

Listed and Candidate Species Alternative: The CDFG suggested consideration of an alternative addressing only those species now designated as rare, threatened or endangered or as candidates for listing under state and federal laws. This alternative, like the listed species only alternative, would not meet BLM and local jurisdiction objectives and federal mandates to conserve species that may be listed in the future.

Existing Reserves Alternative: The CDFG suggested consideration of an alternative addressing only conservation within existing reserves. This alternative is similar to the No Action alternative, which is addressed in detail. It would not meet the objectives of providing an integrated conservation program for the desert tortoise or Mohave ground squirrel and for many other species.

2.10 ALTERNATIVE DROPPED FROM CONSIDERATION

1985-87/ACEC Route Network Alternative: Off road vehicle designations in the West Mojave planning area would remain as they existed prior to the BLM's June 30, 2003 Decision Record. This alternative constituted the route designation component of Draft West Mojave Plan EIR/S Alternative G, the No Action alternative, because at the time the Draft EIR/S was published (mid-June 2003) the June 30, 2003 decision had yet to be made. The 1985-87/ACEC Route Network Alternative no longer is the "No Action" component, as that status has passed to the network adopted by the BLM's June 30, 2003 Decision Record.

The 1985-87/ACEC Route Network Alternative consisted of the motorized vehicle access network designated by the BLM in 1985 and 1987 for the Ridgecrest and Barstow Field Offices, together with networks developed during the preparation of ACEC management plans since 1980 would provide the network that would apply within those ACECs. It is no longer being considered because it included a number of significant weaknesses, including the following:

- Field surveys conducted during 2001 and 2002 revealed that nearly 13 percent of all open routes within the redesign area do not exist on the ground.
- The ACEC networks and the 1985-87 networks were plagued by numerous "edge matching" issues: twenty-five locations were identified where one or more routes from an ACEC network did not connect to corresponding 1985-87 routes on adjacent lands. The network, therefore, was not seamless, and therefore did not constitute an effective and functioning network.
- The network included many design flaws, in that it did not provide for adequate recreational and commercial access and had not been modified to adapt to new circumstances, developments and projects that have occurred in the West Mojave since the middle 1980s. Nor could the designers of the 1985-87 have access to the significant amounts of new biological data that have been obtained since the middle 1980s.

- While the 1985-87 network met most access needs in more remote, less heavily used areas such as Inyo County and the Cady Mountains, the design of the network did not necessarily meet public needs in the more heavily used public in the southwestern portion of the western Mojave Desert[7].

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7 Design weaknesses included the following concerns (by subregion):

- **Coyote:** This is a lightly used area, with little motorcycle use. Most routes designated by the current network serve mining and commercial needs and utility maintenance. The network was not designed to serve recreational demands, so it is not particularly effective in providing access to popular rock hounding sites in Alvord Mountains. Its many long, linear routes provide limited opportunity for general touring, and tend to be destination oriented or lead to dead ends.

- **El Mirage:** The existing network offers very little in way of web of routes, in an area where a lack of a defined network has encouraged trespass riding on private property. Little general touring or connectivity is designed into the existing system, particularly in the Shadow Mountains, where the network is utilitarian but does not encourage, for example, enjoyable jeep touring.

- **Fremont:** The current network is particularly flawed in that it ignores what is considered to be one of most popular off highway vehicle areas, the region just north of Fremont Peak and the Gravel Hills. A location known as Hamburger Mill, just north of Fremont Peak, has traditionally been a very popular area for motorcycle groups to camp and tour. It is very popular with families, for it offers a wide variety of topography and trails demanding a broad spectrum of skills, from novice to highly technical. Large groups tend to congregate here. The current network doesn't provide any access in this area other than broad, four-wheel drive

routes; few if any of the popular motorcycle touring routes in this area and through the Gravel Hills are open. Campsites northeast of Fremont Peak, long used by OHV groups, are particularly affected. Finally, the existing network provides poor access in the Black Mountain area.

- **Juniper:** The current network suffers from many redundant routes. While it addresses most recreation needs, it does not meet current demands for a seamless interface with United States Forest Service route networks.

- **Kramer:** This region has many old motorcycle trails dating from many decades ago. The failure to leave some of these open is particularly important in the Iron Mountains, where the current network provides utilitarian access to mines and other facilities via well-graded routes but does not provide opportunities for OHV touring. The Iron Mountains are a popular area for rockhounding, exploring historic mines, and camping, and a demand for recreation-focused routes exists and is not satisfied by the existing network. Similarly, the Kramer Hills are historically popular with rockhounders, target shooters and motorcylists. The current network provides many two-track routes but no single-track routes. Finally the region as a whole lacks long range touring routes and single-track connectivity.

- **Middle Knob:** Since the existing network was designated, considerable windfarm development has occurred in the surrounding area. The design of the network does not take these developments into account, insofar as providing a recreation experience in this environment is concerned. The current network was not designed with the needs of private property owners in mind (that is, ensuring a minimum of conflicts between recreationists and property owners).

- **Newberry-Rodman:** This area known for rockhounding. The existing network does not ensure nearly as much access to these popular rockhounding areas as the demand warrants; rather, the network tends to be utilitarian rather than recreational in focus. There is a lack of short loops, and no provision for motorcycles (although motorcycle use of this subregion is not nearly as common as elsewhere). The current network is not as effective as it could be in preventing conflicts between recreationists and livestock grazing.

- **Red Mountain:** This is a very important motorcycle recreation area. The current network is particularly lacking in providing for this, in part because the 1985-87 inventory did not address single-track routes. The 1985-87 network effectively curtails quality motorcycle recreation experience, since the network is composed primarily of two-track and graded routes. The network lacks routes in rougher terrain around Red Mountain itself, other than in the form of utilitarian access to commercial mines and facilities. The network tends to be valley and bajada – focused, and directs visitors towards areas they can't access, such as the Grass Valley wilderness.

- **Superior:** This is an important area for 2 track or 4 WD touring. The current network, which is based upon the 1987 inventory, is lacking in providing for this type of recreational opportunity, particularly in the northwest quadrant of this sub region. Unlike the Hamburger Mill area of the Fremont sub region, this sub region is characterized by much more dispersed recreation and camping. Some of the more well-know areas include Rainbow Basin and Opal Mountain. Unfortunately, the network as described by the 1985-1987 fails to not only to adequately meet those dispersed recreation and camping needs, but also includes routes that draw visitors into Fort Irwin expansion area and into the Superior and Water Valleys, (both of which are characterized as having much higher than average densities of tortoise sign), rather than sending them elsewhere.

2.11 COMPARSON OF ALTERNATIVES

As required by the Council on Environmental Quality's Regulations for implementing NEPA, at Section 1502.14, Tables 2-30 through 33 present in comparative form the key components and environmental impacts of the seven alternatives addressed by the EIR/S. BLM multiple use class acreages are presented in Table 2-30. The acres of conservation areas that would be established by each alternative are identified in Table 2-31. A summary of actions proposed for each of the seven alternatives can be found in Table 2-32. Finally, for each species addressed by the plan, Table 2-33 presents a comparison of the acreage of habitat set aside for conservation and the acreage available for incidental take.

Table 2-30
Table Showing Multiple Use Classes in Each Alternative
Acres of BLM land

Alternative	Class C	Class L	Class M	Class I
A Preferred	458,814	1,494,725	715,964	379,906
B BLM Only	458,814	1,494,725	712,190	379,906
C Recovery Plan	458,814	1,494,725	717,540	379,906
D Enhanced Ecosystem Protection	458,814	1,884,740	329,720	373,548
E Enhanced Recreation	458,814	1,598,150	583,803	407,905
F Disease and Predation	458,814	1,494,725	714,229	373,407
G No Action	457,721	1,501,224	877,042	378,467

Numbers are approximate

Table 2-31[1]
Acreage of New Conservation Areas in Each Alternative

	A PREFERRED	B BLM ONLY*	C RECOVERY PLAN	D ENHANCED ECOSYSTEM	E ENHANCED RECREATION	F DISEASE AND RAVEN	G NO ACTION
Tortoise DWMAs	1,523,936	1,038,711	1,551,810	1,539,632	724,133	0	0
MGS Conservation Area	1,726,712	1,308,877	1,726,712	1,726,712	1,711,391	1,726,712	0
Special Review Area	135,037	0	63,340	135,037	135,037	63,340	0
Alkali Mariposa Lily	7,243	0	7,243	7,243	7,243	7,243	0
Barstow Woolly Sunflower	36,211	17,682	36,211	36,211	36,211	36,211	314
Bendire's Thrasher*	28,046	28,046	28,046	28,046	28,046	28,046	0
Big Rock Creek	10,785	0	10,785	10,785	10,785	10,785	0
Carbonate Endemic Plants	5,169	4,393	5,169	5,169	5,169	5,169	0
Coolgardie Mesa	13,354	10,107	13,354	13,354	13,354	13,354	0
Kelso Creek Monkeyflower*	1,870	1,870	1,870	1,870	1,870	1,870	0
Middle Knob	20,495	17,671	20,495	20,495	20,495	20,495	0
Mojave Monkeyflower	57,087	36,630	57,087	57,087	57,087	57,087	0
Mojave Fringe-toed Lizard	42,865	8,485	42,865	42,865	42,865	42,865	0
North Edwards	12,702	0	12,702	12,702	12,702	12,702	0
Parish's Phacelia	898	512	898	898	898	898	0
Pisgah	19,828	17,785	19,828	19,828	19,828	19,828	± 18,000
West Paradise	1,243	257	1,243	1,243	1,243	1,243	0

Many conservation areas overlap; thus, acreages are not totaled. Includes existing ACEC's and Wilderness within the HCA.

* Acreages are for BLM managed lands only

[1]. The acreages in this table have changed from those in the draft EIR/EIS to reflect corrections and changes in the Conservation Area boundaries.

Table 2-32
Summary of EIS Alternatives

	ALTERNATIVE A INTERAGENCY CONSERVATION PLAN	ALTERNATIVE B BLM ONLY	ALTERNATIVE C TORTOISE RECOVERY PLAN	ALTERNATIVE D ENHANCED ECOSYSTEM PROTECTION	ALTERNATIVE E ONE DWMA ENHANCED RECREATION OPPORTUNITIES	ALTERNATIVE F NO DWMA AGGRESSIVE DISEASE & RAVEN MANAGEMENT	ALTERNATIVE G NO ACTION
OVERVIEW							
Overview	Conservation strategy seeks to balance conservation of sensitive plants and animals, and multiple use of the western Mojave Desert, providing motorized vehicle access where appropriate, while meeting FESA and CESA permit issuance criteria.	Same as Alternative A, implemented on BLM lands only. Case by case CESA and ESA compliance on private lands, as at present.	Desert Tortoise Recovery Plan actions serve as conservation strategy for tortoise. Other Species: Alternative A conservation strategy.	High priority on conservation of sensitive plants and animals, even if this requires limits on motorized vehicle access to and multiple use of the western Mojave Desert.	Single 1,000 mi^2 DWMA, composed of high-density areas. Alternative D program within DWMA, except as noted below. Elsewhere, multiple use with special emphasis on enhancing recreation. Other Species: Alternative A conservation strategy.	Intensive raven and tortoise disease management program, supported by limited fencing, rather than habitat protection and acquisition. Other programs - low priority for funding or eliminated. Other Species: Alternative A conservation strategy.	Current management continues. The Wildlife Element of the CDCA Plan, as amended, lists applicable public laws, acts, and executive orders that provide direction to the BLM in managing wildlife resources.
HCP?	Yes	No	Yes				No
Biological Goal	The biological goals identified for Alternative A would apply to all alternatives.						
CONSERVATION AREAS							
BLM Multiple Use Class Changes	See Table 2-31.						
Conservation Areas	See Table 2-32						
Special Review Areas	3 SRAs - 2 tortoise, 1 Little San Bernardino Mountain gilia.	No SRAs		3 SRAs - 2 tortoise, 1 Little San Bernardino Mountain gilia.		1 SRA - Little San Bernardino Mountains gilia.	No SRA.
Tortoise DWMA Status	Area of Critical Environmental Concern					None	
MGS CA Status	Wildlife Habitat Management Area			ACEC	Wildlife Habitat Management Area		None
Other New Special Designations	Two new Key Raptor Areas (Middle Knob and Argus Mountains).	Two new Key Raptor Areas (Middle Knob and Argus Mountains).	Ord Rodman ecological reserve and research natural area. Cattle grazing experimental management zone in Ord-Rodman DWMA. Carbonate endemic	Emergency management zones in Brisbane Valley and Copper Mountain Mesa to study effects of sheep/OHV use and urbanization,	Fremont Recreation Area. Enduro Corridor from El Mirage Open Area to Spangler Hills Open Area	None	None.

	ALTERNATIVE A INTERAGENCY CONSERVATION PLAN	ALTERNATIVE B BLM ONLY	ALTERNATIVE C TORTOISE RECOVERY PLAN	ALTERNATIVE D ENHANCED ECOSYSTEM PROTECTION	ALTERNATIVE E ONE DWMA ENHANCED RECREATION OPPORTUNITIES	ALTERNATIVE F NO DWMA AGGRESSIVE DISEASE & RAVEN MANAGEMENT	ALTERNATIVE G NO ACTION
			plants RNA.	respectively, on tortoises.			
COMPENSATION AND ALLOWABLE GROUND DISTURBANCE							
Compensation Framework	Three-tiered mitigation fee areas, derived from multipliers of 5:1, 1:1 and 0.5:1 times average HCA land value. Replaces most current mitigation, enhancement and endowment fees, many survey costs, time delays.	5:1 compensation within tortoise DWMAs; elsewhere, existing enhancement and endowment fees, survey costs, time delays.	Same as Alternative A.	Same as Alternative A, except - additive fees for multiple species, not to exceed a specified ratio (e.g. 7:1). Directed mitigation for plants.	Same as Alternative A; smaller HCA.	Same as Alternative A; smaller HCA.	Current Management: Desert tortoise management oversight group's (MOG) existing tortoise formula; CDFG enhancement and endowment fees, survey costs, time delays.
Allowable Ground Disturbance	One percent threshold, applicable within HCA, tracked by jurisdiction.	One percent threshold for BLM lands within HCA.	Not Applicable	One percent, tracked by conservation area and by jurisdiction.	Same as Alternative A.	Not applicable.	No limits
Restoration of existing ground disturbance	Habitat credit component.	Same as Alternative A, except applicable to BLM lands only.	Restore surface disturbance within DWMAs to pre disturbance conditions	Program to reclaim habitats in HCA to be developed by Implementing Team.	Same as Alternative A, applied to smaller HCA.	Current Management. (Tamarisk removal and habitat restoration at Afton Canyon, Salt Creek, Harper Lake, intensive rehabilitation in recently burned areas.)	Tamarisk removal and habitat restoration at Afton Canyon, Salt Creek, Harper Lake, intensive rehabilitation in recently burned areas.
MOTORIZED VEHICLE ACCESS AND RECREATION							
Motorized Vehicle Access Network: Components	Maintain existing route network (adopted June 30, 2003), except for minor modifications including: redesign of Juniper subregion network; selected route closures in Lane Mountain Milk vetch, Mohave monkeyflower and Barstow woolly sunflower conservation areas and Red Mountain subregion; reestablish "C" routes northeast of Spangler Hills Open Area, and designate additional open routes in Summit Range and east of Haiwee Reservoir. El Paso Collaborative Access Planning Area -- adopt 1985-87 and initiate follow-on community-based off road vehicle designation program.			Same as Alternative A except: - Only "street legal" vehicles allowed in biologically sensitive DWMA areas,	Same as Alternative A, except more intensive recreational uses of network allowed.	Same as Alternative A.	Maintain existing motorized vehicle route networks (adopted June 30, 2003).
Motorized Vehicles: Competitive	No vehicle speed events allowed in DWMAs or		All competitive and	All competitive and	Outside DWMA,	Vehicle speed events	Vehicle speed

	ALTERNATIVE A INTERAGENCY CONSERVATION PLAN	**ALTERNATIVE B** BLM ONLY	**ALTERNATIVE C** TORTOISE RECOVERY PLAN	**ALTERNATIVE D** ENHANCED ECOSYSTEM PROTECTION	**ALTERNATIVE E** ONE DWMA ENHANCED RECREATION OPPORTUNITIES	**ALTERNATIVE F** NO DWMA AGGRESSIVE DISEASE & RAVEN MANAGEMENT	**ALTERNATIVE G** NO ACTION
Events	MGS Conservation Area. Dual sport allowed seasonally in DWMAs, subject to limitations; year round elsewhere. Johnson Valley to Parker Race allowed, Barstow to Vegas racecourse eliminated, Stoddard to Johnson Valley corridor replaced by connector route.		organized events (including dual sport) prohibited within DWMAs.	organized events (including dual sport) prohibited within DWMAs. Stoddard to Johnson, Barstow to Vegas eliminated.	same as Alt A, except: Reopen competitive C routes by Spangler Open Area, allow competitive events between Shadow Mtn Road and El Mirage open area. In small DWMA, competitive events prohibited.	allowed case by case; EA prepared for each event	events allowed case by case; EA prepared for each event
Motorized Vehicles: Public Land Stopping and Parking	DWMAs - allowed 50 feet from centerline of the designated route, 300 feet elsewhere.		Within DWMAs, allowed in designated areas, within 300 feet of centerline of elsewhere.	Within DWMAs, allowed 15 feet from center line of the designated route.	In small DWMA, allowed 50 feet from center line. Elsewhere, within 100 feet in MUC L, 300 feet elsewhere	Within 100 feet of open routes in BLM class L, 300 feet elsewhere.	
Public Land Motorized Vehicle Camping	Within DWMAs, allowed in previously existing disturbed camping areas adjacent to open routes, within 300 feet of centerline elsewhere.		Within DWMAs, allowed in designated areas, within 300 feet of centerline elsewhere.	Designated areas only. Consolidate multiple camping sites into one official BLM campground.	Within small DWMA, same as alternative A. Elsewhere, allowed except where prohibited.	Allowed within 100 feet of open routes in BLM class L, 300 feet elsewhere.	
Other Recreation Measures	None		DWMAs may provide forms of recreation compatible with tortoise recovery.	Establish EMZ in Brisbane Valley to study effects of OHV on tortoise	(1) Expand Spangler Hills, Johnson Valley open areas (2) Fremont Recreation Area	None	
	Minimum impact recreation (e.g., hiking, equestrian uses, bird watching, photography) allowed in all areas.						
SPECIES CONSERVATION MEASURES: GENERALLY APPLICABLE							
Fire	Current Management		Fire suppression that minimizes surface disturbance (reflects current management).	Current management except, avoid use of heavy equipment and excessive ground disturbance in HCA	Current Management		
Highways - Maintenance	In DWMAs, seasonal restrictions, roadbed and berm requirements, no use of invasive weeds for landscaping	Same as Alt A, but limited to BLM lands.	Same as Alt A. Monitors assigned to all maintenance crews.	Same as Alternative A.			Current Management

	ALTERNATIVE A INTERAGENCY CONSERVATION PLAN	ALTERNATIVE B BLM ONLY	ALTERNATIVE C TORTOISE RECOVERY PLAN	ALTERNATIVE D ENHANCED ECOSYSTEM PROTECTION	ALTERNATIVE E ONE DWMA ENHANCED RECREATION OPPORTUNITIES	ALTERNATIVE F NO DWMA AGGRESSIVE DISEASE & RAVEN MANAGEMENT	ALTERNATIVE G NO ACTION
	in DWMAs.						
Hunting and Shooting	As regulated by current legislation.		DWMAs - No Shooting except hunting Sept - Feb	DWMA public lands: shooting other than hunting not allowed.	Same as Alternative A.		As regulated by current legislation.
Land Acquisition: General	Acquire private lands in HCA and manage for species recovery; set acquisition priorities. BLM's land tenure adjustment (LTA) program continues, modified by retention and acquisition of lands within HCA.		Acquire private lands in HCA; set acquisition priorities. Acquire all private lands in DWMA	Acquire private lands in HCA; set acquisition priorities; intent is to acquire as much private land as practicable. LTA program continues.	Acquire private lands in HCA; set acquisition priorities. DWMA given high priority for acquisition. LTA program continues.	LTA land acquisition program. Acquire private lands in multi-species CA.	LTA land acquisition program. No other overarching acquisition goal.
Land Acquisition	Maintain stability of local tax base.		Tax base changes acceptable.		Maintain stability of local tax base.		Current Management: Tax base changes acceptable.
Mining	Allowed; BLM Plans of Operations as currently, and in expanded ACECs (including all DWMAs) and expanded Class L areas. Existing permitted mines continue according to Plans of Operation. Selected withdrawals from mineral entry.		Mining allowed case by case, provided not significantly impact tortoise habitat or populations; restoration.	See Alternative A. If source areas identified for MGS, consider mineral withdrawals. Restoration standard.	Same as Alt A, though DWMA ACEC is much smaller.	Allowed. BLM Plans of Operations on Class L and existing ACECs. Reclamation standard.	
Utility Corridor	Retain BLM's network of CDCA Plan utility corridors.						
CONSERVATION MEASURES SPECIFIC TO DESERT TORTOISE							
Tortoise Take-Avoidance Measures							
Commercial Activities	Current Management		Modify ongoing and planned activities.	Current management.			
Highways in DWMAs	No new paved roads within tortoise DWMAs other than Caltrans pre-approved projects (see above).		Restrict establishment of new roads in DWMAs.	No new paved roads within DWMAs other than Caltrans pre-approved projects.		Highway proposals considered case-by-case.	

	ALTERNATIVE A INTERAGENCY CONSERVATION PLAN	**ALTERNATIVE B** BLM ONLY	**ALTERNATIVE C** TORTOISE RECOVERY PLAN	**ALTERNATIVE D** ENHANCED ECOSYSTEM PROTECTION	**ALTERNATIVE E** ONE DWMA ENHANCED RECREATION OPPORTUNITIES	**ALTERNATIVE F** NO DWMA AGGRESSIVE DISEASE & RAVEN MANAGEMENT	**ALTERNATIVE G** NO ACTION
Tortoise Survey and Disposition Protocols							
Tortoise Pre-Construction Surveys	Within DWMAs, presence-absence and clearance surveys. - In survey areas, clearance surveys; no Presence-absence surveys. In No Survey areas, no surveys.	Presence-absence surveys required in all areas, clearance surveys where tortoise sign is found.		Same as Alternative A.	Same as Alternative A, except Survey Area includes all lands outside Non-Survey Area and the single DWMA.	Presence-absence surveys required in all areas, clearance surveys where tortoise sign is found.	
Best Management Practices for Tortoise Habitat	Level 1 BMPs in DWMAs. Level 2 outside of DWMAs, but within tortoise survey areas.	Level 1 BMPs in DWMAs, on BLM lands only.	No BMPs. Modify ongoing and planned activities.	Level 1 BMPs in DWMA and Survey Area. Mandatory monitoring or fencing.	Level 1 BMPs in DWMAs. Level 2 outside of DWMAs, but in survey areas.	Terms and Conditions in biological opinions. Stipulations specified in right-of-way grants, e.g., to minimize impacts. Case by Case for private projects.	
Tortoise Handling Guidelines	Standard handling and disposition guidelines for all lands.	Standard handling and disposition guidelines for BLM land only. Case-by-case mitigation elsewhere.	Drop-off site for captive tortoises. Use for research and education.	Same as Alternative A.			Existing guidelines.
Tortoise Proactive Management							
Disease Program	Disease research and strategies considered at level of the MOG. Disease management program suggested, but low priority.		Based upon research findings, if needed: fences between Superior Cronese and Fremont Kramer DWMA; Study epidemiology of URTD and other diseases	High priority disease management program; balance priority with habitat conservation.	Same as Alternative A, except special attention to ensure that fences do not restrict OHV opportunities	Same as Alternative D, except disease management program receives very highest priority; little habitat conservation.	Disease research and strategies considered at level of the MOG.
Fencing - Highways	Yes						
Fencing: Urban Interface	Yes				No	Yes	No
Headstarting	Pilot facility -- Fremont-Kramer DWMA.		No program.	Establish at least five sites within three years of plan adoption.	Pilot facility -- Superior Cronese DWMA.	No program.	
Law Enforcement	8 new law enforcement rangers and 8 new maintenance workers assigned to DWMAs, dedicated full-time to natural resources and		Patrols by law enforcement	Same as Alternative A.	Same as Alt A, except adjust numbers for	No adjustment in size of ranger force.	

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	implementation.				smaller DWMA.		
Ravens	Raven management program. Landfill limits.	Raven management program, public lands only.	Reduce Ravens. Land fill limits	Same as Alternative A.		Very high priority Raven management program; landfill limits	No program.

Table 2-33
Acreage of Conservation and Incidental Take of Covered Species in Each Alternative.

	A PREFERRED		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Desert tortoise	1,477,630	See text for ITA	1,023,329	454,301 in DWMA. See text for ITA	1,514,847	See text for ITA	1,505,494	4,393 See text for ITA	715,424	4,393 in DWMA. See text for ITA	See text – different approach		DTNA, Cat 1 habitat	Unk.
Mohave ground squirrel	1,701,947	See text for ITA	1,280,106	See text for ITA	1,701,947	See text for ITA	1,701,947	See text for ITA	1,701,947	See text for ITA	1,701,947	See text for ITA	0	Unk.
Alkali Mariposa Lily	Permanent = 3,500+ Isolated sites	40,861	0	40,861	Permanent = 3,500+ Isolated sites	40,861	Permanent = 3,500+ Isolated sites	40,861	Permanent = 3,500+ Isolated sites	40,861	Permanent = 3,500+ Isolated sites	40,861	0**	68,171
Barstow Woolly Sunflower	50,548+	50	17,682+	32,872	50,548+	50	50,548+	50	50,548+	50	50,548+	50	0	Unk., estimated at 32,872 +
Bats	All significant roosts	< 25 bats at any one site	All significant roosts	No t limited	All significant roosts	< 25 bats at any one site	All significant roosts	< 25 bats at any one site	All significant roosts	< 25 bats at any one site	All significant roosts	< 25 bats at any one site	Roosts gated on case-by-case basis	Unk.
Bendire's Thrasher*	132,497	3,973	132,497	3,973	132,497	3,973	132,497	3,973	132,497	3,973	132,497	3,973	106,710	29,760
Brown-crested flycatcher	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Big Morongo ACEC	Unk.
Burrowing owl	Unk.	No mortality. Limited.	Occurrences on BLM lands	No mortality. Limited.	Unk.	No mortality. Limited.	Unk.	No mortality. Limited.	Unk.	No mortality. Limited.	Unk.	No mortality. Limited.	0**	Unlimited
Carbonate Endemic Plants	5,169	Minimal	4,393	776	5,169	Minimal	5,169	Minimal	5,169	Minimal	5,169	Minimal	0	Unk.
Charlotte's phacelia	All known sites	50	30 of 37 sites	7 sites	All known sites	50	All known sites	50	All known sites	50	All known sites	50	30 of 37 sites	7 sites
Crucifixion thorn	All known sites	50	All known sites	50	All known sites	50	All known sites	50	All known sites	50	All known sites	50	0	Unk.
Desert cymopterus	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	Most occupied habitat	50	0	Unk. Estimated at 14,343

	A PREFERRED		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Ferruginous hawk	Prevents and remedies electrocution threat	Unknown but minimized	Prevents and remedies electrocution threat on BLM lands	Potential electrocutions on private lands	Prevents and remedies electrocution threat	Minimized	Prevents and remedies electrocution threat	Minimized	Prevents and remedies electrocution threat	Minimized	Prevents and remedies electrocution threat	Minimized	Electrocution threat minimized for new power lines on BLM lands	Unk.
Golden eagle	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	17,671 at Middle Knob. Prevents and remedies electrocution threat on BLM lands	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Prevents and remedies electrocution threat. Minimizes mining impacts.	0	20,495 at Middle Knob. Electrocution threat minimized for new power lines on BLM lands	0
Gray vireo	15,954+	Unk.	4,393+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	0**	Unk.
Inyo California towhee	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)	98% of area (public lands)	2% of area (private lands)
Kelso Creek Monkeyflower*	1,870	50	1,870	Unk. Minimal	1,870	Unk. Minimal	1,870	Unk. Minimal	1,870	Unk. Minimal	1,870	Unk. Minimal	0**	Unk. Minimal
Kern buckwheat	All except <0.1	<0.1	Most occupied habitat	Estimated 5 acres	All except <0.1	<0.1	All except <0.1	<0.1	All except <0.1	<0.1	All except <0.1	<0.1	Unk.	Estimated 10 acres
Lane Mountain milkvetch	14,597	0	10,164	4,433	14,597	0	14,597	0	14,597	0	14,597	0	Unk.	4,433+
LeConte's thrasher	1,782,892	Unk.	1,392,984	Unk.	1,811,468	Unk.	1,782,892	Unk.	1,521,707	Unk.	48,804+	Unk.	48,804+	Unk.
Little San Bernardino Mountains gilia	All known drainages	50	Sites within JTNP	All other known drainages	All known drainages	50	All known drainages	50	All known drainages	50	All known drainages	50	Sites within JTNP	All other known drainages
Mojave fringe-toed lizard	42,865+	4 sites, see text	37,270	5,595+	42,865+	4 sites, see text	42,865+	4 sites, see text	42,865+	4 sites, see text	42,865+	4 sites, see text	0	Unk.
Mojave monkeyflower	57,087	Unk.	36,630	20,457	57,087	50	57,087	50	57,087	50	57,087	50	0	Unk.
Mojave River vole	All sites (conditional)	0	0	Unk	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	0**	Unk.

	A PREFERRED		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Mojave tarplant	All occupied habitat	50 (new locations)	All occupied habitat	Unk.	All occupied habitat	50 (new locations)	All occupied habitat	50 (new locations)	All occupied habitat	50 (new locations)	All occupied habitat	50 (new locations)	All occupied habitat	Unk.
Parish's alkali grass	All of single known site	0	0	Unk.	0	All of single known site	0	All of single known site	0	All of single known site	0	All of single known site	0	Unk.
Parish's phacelia	898	50	512	376	898	50	898	50	898	50	898	50	0	Unk.
Parish's popcorn flower	All of single known site	0	0	Unk.	All of single known site	0	All of single known site	0	All of single known site	0	All of single known site	0	Unk.	Unk.
Prairie falcon	20,495 at Middle Knob. Minimizes mining impacts.	0	17,671 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	0	20,495 at Middle Knob. Minimizes mining impacts.	Unk.
Red Rock poppy	All occupied habitat	50	All occupied habitat	Minimal	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	Most habitat	Unk.
Red Rock tarplant	All occupied habitat	50	All occupied habitat	Minimal	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	All occupied habitat	50	Most habitat	Unk.
Salt Springs checkerbloom	All of single known site	0	0	Unk.	All of single known site	0	All of single known site	0	All of single known site	0	All of single known site	0	0	Unk.
San Diego horned lizard	15,954+	Unk.	4,393+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	15,954+	Unk.	0**	Unk.
Shockley's rock-cress	5,169	0	4,393	776	5,169	0	5,169	0	5,169	0	5,169	0	4,393 but no added management	776
Short-joint beavertail cactus	10,785	50	0	All	10,785	50	10,785	50	10,785	50	10,785	50	Existing SEAs and 1,590 scattered BLM parcels	0**
Southwestern pond turtle	All known sites (conditional at some)	Unk.	Selected sites	Unk.	All known sites (conditional at some)	Unk.	All known sites (conditional at some)	Unk.	All known sites (conditional at some)	Unk.	All known sites (conditional at some)	Unk.	Selected sites	Unk.
Southwestern willow flycatcher	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Big Morongo ACEC	Unk.
Summer tanager	Mojave River sites (conditional)	Unk.	Selected sites	Unk.	Mojave River sites (conditional	Unk.	Mojave River sites (conditional	Unk.	Mojave River sites (conditional	Unk.	Mojave River sites (conditional	Unk.	Selected sites – see text	Unk.
Triple-ribbed milkvetch	All known sites	0	Sites on public land	Unk.	All known sites	0	All known sites	0	All known sites	0	All known sites	0	Sites on public land	Unk.

	A PREFERRED		B BLM ONLY*		C RECOVERY PLAN		D ENHANCED ECOSYSTEM		E ENHANCED RECREATION		F DISEASE AND RAVEN		G NO ACTION***	
	Conserved	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**	**Conserved**	**Take**
Vermilion flycatcher	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Selected sites – see text	Unk.
Western snowy plover	All known sites	0	All known sites	0	All known sites	0	All known sites	0	All known sites	0	All known sites	0	Most known sites	Unk.
White-margined beardtongue	All known sites	50	Most known sites	Unk.	All known sites	50	All known sites	50	All known sites	50	All known sites	50	0	Minimal
Yellow-eared pocket mouse	Unk	Unk	Selected ACECs	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Selected ACECs	Unk
Yellow warbler	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Selected sites – see text	Unk.
Western yellow-billed cuckoo	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	All sites (conditional)	0	Unk.	Unk.
Yellow-breasted chat	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Mojave River sites (conditional)	0	Mojave River sites (conditional) 10,785 (Big Rock Creek))	0	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Mojave River sites (conditional) 10,785 (Big Rock Creek)	0	Selected sites – see text	Unk.

See also Table 2-11. Unk. = Unknown. * Acreages are for BLM managed lands only

** Los Angeles County may expand its SEA boundaries, providing some conservation for this species.
*** See text for potential conservation of the No Action Alternative. Continued review of projects under CEQA, by BLM in Category 1 habitat, and by FWS in occupied and critical habitat will result in some conservation by provision of compensation lands or set-asides.

CHAPTER THREE
AFFECTED ENVIRONMENT

3.1 PLANNING AND REGULATORY FRAMEWORK

The West Mojave planning area includes eleven cities and portions of four counties. These cities and counties have land use planning responsibility for the private lands located within their jurisdictions. Map 3-1 (see attached CD Rom) displays political boundaries and land ownership within the planning area. Public lands within the western Mojave Desert are planned for and managed by the United States government (Bureau of Land Management, National Park Service and Department of Defense), and the State of California (CDFG, California Department of Parks and Recreation, and Caltrans). Land ownership political boundaries are displayed in Map 3-1. Table 3-1 lists the acreage of land within each political and land management entity (the acres given for the cities and towns do not include spheres of influence).

The following discussion identifies, by jurisdiction, land use and development trends, planning, and management actions that may be affected by the proposed action.

3.1.1 Bureau of Land Management

3.1.1.1 California Desert Conservation Area Plan

The BLM administers 3,263,874 acres of public lands within the planning area. Management is guided by the BLM's California Desert Conservation Area Plan, adopted in 1980 and amended on numerous occasions since then. Congress specifically directed the BLM to prepare the CDCA Plan the Federal Land Policy and Management Act of 1976. Finding that the California desert and its resources, "including certain rare and endangered species of wildlife, plants and fishes" are "seriously threatened by air pollution, inadequate Federal management authority, and pressures of increased use, particularly recreational use", Congress stated that "the use of all California desert resources can and should be provided for in a multiple use and sustained yield management plan to conserve these resources for future generations, and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles." To accomplish this, BLM was directed to prepare a plan for the "management, use, development, and protection of public lands within the California Desert Conservation Area" (of which the western Mojave Desert comprises the northwestern third). The plan would "take into account the principles of multiple use and sustained yield in providing for resource use and development, including, but not limited to, maintenance of environmental quality, rights of way, and mineral development."

Table 3-1
Acreage Summary by Jurisdiction

JURISDICTION	PRIVATE LAND	STATE LAND (SUBDIVIDED)	MILITARY LAND	BLM MANAGED LAND	OTHER FEDERAL	OTHER PUBLIC	TOTAL ACREAGE
Inyo Co. (Total Acreage)	30,057	12,658 – SLC	456,164	332,044	9 - NPS 116 - USFS	174	831,221
Kern Co. (Total Acreage)	757,959	2,076 - SLC 81 - CDFG 14,489 – Parks	287,227	505,093	1,720 - USFS		1,568,644
Kern Co. (Excluding Cities)	593,766	[same]	281,577	494,306	[same]		1,388,014
Los Angeles Co. (Total Acreage)	610,959	38 – SLC 12,454 – Parks	53,547	7,226	377 - USFS		684,602
Los Angeles Co. (Excluding Cities)	464,487	[same]	47,630	7,138	[same]		532,125
Riverside Co. (Total Acreage)	9,231	2,784 – SLC 10 – Parks		41,815	208,170 - NPS	57	262,066
San Bernardino Co. (Total Acreage)	1,621,024	53,503 – SLC 3,861 - CDFG 213 – Parks	1,870,508	2,377,671	84,510 – NPS 91 - USFS 167 - Tribal	912	6,012,511
San Bernardino Co. (Excluding Cities)	1,383,188	53,105 - SLC [same for others]	1,858,185	2.368,559	84,500 - NPS 90 - USFS 2 - Tribal	807	5,748,707
Tulare Co.	1			25			26
Adelanto (SB)	33,343		91	514			33,949
Apple Valley (SB)	45,464	43 – SLC		1,347		59	46,912
Barstow (SB)	19,027	40 – SLC	4,061	2,281			25,407
California City (K)	84,519			4,757			89,276
Hesperia (SB)	42,322		955	68	1		43,385
Lancaster (LA)	60,592						60,592
Palmdale (LA)	57,545		5,806	68			63,439
Ridgecrest (K)	6,103		4,972	1,163			12,238
Twentynine Palms (SB)	31,802		2,146	3,502	8		37,623
Victorville (SB)	41,699	38 – SLC	5,030	346		47	47,160
Yucca Valley (SB)	24,176	277 – SLC		1,052	2		25,508
Total Acreage	3,029,230	71,059 – SLC 27,166 -Parks 3,943 – CDFG	2,667,445	3,263,874	292,689 – NPS 2,356 - USFS 167 – Tribal	1,143	9,359,070

The CDCA Plan assigns a "multiple use class" designation to each parcel of public land, and provides land use and management guidelines for each class. These classes include:

- Class C – controlled use, that is, wilderness areas.
- Class L -- limited use, protecting sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.
- Class M -- moderate use, providing for a controlled balance between higher intensity uses and resource protection.
- Class I -- intensive use, providing for concentrated use of lands and resources to meet human needs.

Within the western Mojave Desert, 457,721 acres are designated Class C, 1,269,313 acres Class L, 877,042 acres Class M and 378,467 acres Class I. About 281,331 acres are unclassified.

The CDCA Plan also adopted 12 "plan elements." Each element provides desert-wide planning decisions that focus on a major resource or issue of public concern. Management of sensitive plant and animal species, including the designation of BLM crucial habitat and habitat management areas, is provided by the wildlife element. Procedures for establishing a motorized vehicle access network are set forth in the motorized vehicle access element.

3.1.1.2 Areas of Critical Environmental Concern

Thirty areas of critical environmental concern have been established by the BLM within the western Mojave Desert. These were designated by the 1980 CDCA Plan or added by subsequent amendments to that plan. Specific management plans have been prepared for most of these areas. The ACECs that would be affected by the West Mojave Plan are described below[1].

Afton Canyon (4,726 acres): This ACEC protects a sensitive Mojave River riparian community and the scenic canyon in which it is located. An Afton Canyon Natural Area management plan (1989) was prepared in cooperation with the CDFG under the Sikes Act and covers a larger area than the ACEC. The plan protects the ACEC and the adjacent desert habitat in the Cady Mountains, which is occupied habitat for bighorn sheep and contains nest sites for prairie falcon and golden eagle. Visitor facilities include two campgrounds, an equestrian campground, the Mojave Road, and interpretative signs and kiosks.

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1 The West Mojave Plan would not affect the following ACECs: Amboy Crater, Bedrock Springs, Big Morongo Canyon, Soggy Dry Lake Creosote Rings, Upper Johnson Valley Yucca Rings and Whitewater Canyon.

The 1989 management plan recommended these amendments to the CDCA Plan:

- Expansion of the boundary of the ACEC by 3,840 acres, and deletion of 480 acres, making the expanded ACEC 8,160 acres in size.

- Withdrawal of all lands within the expanded ACEC boundary from mineral entry.

- Changing the CDCA Plan multiple use class designations M to L on certain lands within the expanded ACEC.

Barstow Woolly Sunflower (314 acres): BLM established a botanical ACEC northeast of Kramer Junction to protect the Barstow woolly sunflower. Although the area protects a relatively large population of this species, it represents only a small proportion of the overall range, which is limited to the western Mojave Desert. The desert tortoise and Mohave ground squirrel are also found within the ACEC. The State of California owns nine sections of land to the east and west, which CDFG manages for protection of desert plants and animals.

Bedrock Springs (785 acres): Bedrock Springs, located at the edge of the Golden Valley Wilderness, was established by the CDCA Plan to protect prehistoric values.

Black Mountain (61,806 acres): The Black Mountain ACEC is one of the largest in the western Mojave Desert to protect the prehistoric and Native American values of this area northwest of Barstow. A management plan was approved in 1988. The ACEC lies entirely within the proposed Superior-Cronese and Fremont-Kramer DWMAs. The southeastern half is within the Black Mountain Wilderness. It includes critical habitat for the desert tortoise, and known occupied habitat for the Mojave ground squirrel, LeConte's thrasher, desert cymopterus and Barstow woolly sunflower. Nest sites are present for golden eagle and prairie falcon.

Calico Early Man Site (898 acres): This National Register Property was established as an ACEC in 1980, and a management plan was prepared in 1984. The plan designated a vehicle route network and specified ways to protect the evidence of ancient human occupation.

Christmas Canyon (3,444 acres): The Christmas Canyon ACEC protects prehistoric values. Most of the ACEC lies within the Spangler Hills Open Area in San Bernardino County. The 1988 ACEC management plan prescribed ways that the archaeological resources could be protected within an area open to recreational vehicle use.

Cronese Basin (10,226 acres): The BLM designated the Cronese Lakes, north of Interstate 15 between Barstow and Baker, as an ACEC to protect valuable cultural and natural resources. Ephemeral wetlands are present on the lakes, which serve as stopover points for migratory waterbirds and nesting sites for many species during very wet years. Mesquite hummocks and desert willow washes add to the biological importance, and the dunes and sand sheets are occupied habitat for the Mojave fringe-toed lizard. The desert tortoise is found in low densities. A management plan was published in 1985.

Desert Tortoise Research Natural Area (25,695 acres): The CDCA Plan of 1980 designated lands north of California City in Kern County as an ACEC and a Research Natural Area. A management plan for the ACEC, prepared under authority of the Sikes Act, was approved in 1988. The ACEC is jointly managed by the BLM, CDFG and the Desert Tortoise Preserve Committee, a non–profit group established to acquire and manage lands for protection of the desert tortoise.

Fossil Falls (1,667 acres): The Fossil Falls ACEC was established in 1980 to protect prehistoric values. A management plan was approved in 1986.

Great Falls Basin (9,726 acres): The Great Falls Basin ACEC management plan was prepared in 1987 in cooperation with the CDFG under the Sikes Act. It adjoins the Indian Joe Canyon Ecological Reserve and the northern portion is within the Argus Range Wilderness. The southern portion is within a BLM wilderness study area. The western boundary is contiguous with the China Lake Naval Air Weapons Station.

The ACEC protects unique and valuable wildlife and scenic resources. Foremost among these are the dozens of seeps and springs that serve as habitat for the threatened Inyo California towhee. Designated critical habitat for the towhee is present within the ACEC. In addition, large populations of quail and chuckar are present, as is a remnant population of bighorn sheep. Raptors nesting within the ACEC include golden eagle, prairie falcon, and long-eared owl. Potential habitat exists for the Panamint alligator lizard.

- **Harper Dry Lake (475 acres):** The ACEC was established to protect the remnant marshes at the southwestern edge of Harper Dry Lake. The marsh and alkali wetland community bordering Harper Dry Lake hold potential for discovery of several rare and restricted-range plant species.

The playa bordering the marshes supported nesting Western snowy plovers in the past, and surveys conducted in 2001 found these birds to be present and probably nesting. Harper Dry Lake is an area important for the conservation of Western snowy plover nesting habitat.

Harper Dry Lake is recognized as a Key Raptor Area by the BLM, which has designated 223 such areas nationwide. Key Raptor Areas are places known to be significant habitats for selected species of birds of prey, and Harper Dry Lake is one of seven Key Raptor Areas in the Mojave Desert. The species known to utilize the habitat at Harper Dry Lake are northern harrier, short-eared owl, ferruginous hawk and long-eared owl.

Harper Dry Lake has been improved as a Watchable Wildlife site, a program to provide access and facilities to visitors for birdwatching, photography and passive recreation. Arrangements are now being made to supply surface water to the remnant marsh, and interpretative kiosks, restrooms, and trails have been installed.

Jawbone/Butterbredt (187,486 acres): The 1982 Sikes Act Plan for Jawbone Butterbredt ACEC addressed the Sierra/Mojave/Tehachapi Ecotone Wildlife Habitat Management Area, a designated "special area" in the CDCA Plan. The ACEC plan incorporated

all of the Rudnick Common Grazing Allotment and the vehicle management boundary agreement between the BLM and the Rudnick Estate Trust. Motorized vehicle routes of travel were designated within the ACEC, which includes both designated wilderness and the Jawbone Canyon Open Area. The Pacific Crest Trail crosses the ACEC as well.

The ACEC was established to manage and protect significant cultural and wildlife values of this transition zone between the mountains and the northwestern Mojave Desert. Among the wildlife habitats present are Butterbredt Springs, an important migratory bird stopover site, habitat for the yellow-eared pocket mouse in Kelso Valley, and the raptor and vulture migratory corridor between the Kern River Valley and the Mojave River. Nearly the entire range of a West Mojave endemic, the Kelso Creek monkeyflower, is located within the ACEC.

Juniper Flats (2,528 acres): An ACEC was established for the Juniper Flats Cultural Area in 1980, and a management plan was prepared in 1988. The foothill area south of Apple Valley containing springs and riparian habitat in a dense stand of junipers was an important Native American habitation and special use site. Juniper Flats also provides important habitat for the San Diego horned lizard and the gray vireo. The Willow fire in 2000 burned over the entire ACEC, leading to a temporary closure of the area until vegetative recovery had begun. Juniper Flats is an important equestrian riding area and provides access to the Deep Creek hot springs in the San Bernardino National Forest.

Last Chance Canyon (5,913 acres): The CDCA Plan designated Last Chance Canyon in the El Paso Mountains as an ACEC in 1980. A Plan Amendment in 1984 adjusted the boundaries to include additional prehistoric sites. This amendment implemented a recommendation of the ACEC management plan, which was completed in 1982. The archaeological sites are part of a larger archaeological district placed on the National Register of Historic Places in 1971.

Manix (2,897 acres): The Manix ACEC, located 20 miles northeast of Barstow along the Mojave River, was established in 1990 to protect paleontological and cultural resources. This site contains blowsand habitat for the Mojave fringe-toed lizard. No management plan has been prepared.

Mojave Fishhook Cactus (628acres): A CDCA Plan Amendment established the Mojave fishhook cactus ACEC in 1984. The ACEC is composed of two separate parcels in the Brisbane Valley. The purpose of the ACEC is to protect the yellow-spined form of the Mojave fishhook cactus. Subsequent studies have shown that this area may be important to the Mohave monkeyflower as well. A management plan was completed in 1990, which designated motorized vehicle routes within the ACEC.

Rainbow Basin (4,087 acres): This ACEC, established in 1980, lies ten miles north of Barstow. It includes two campgrounds, a scenic loop drive, hiking trails and an interpretive trail. The area is popular with visitors who come to see the colored geological formations. The ACEC protects two nest sites for the prairie falcon. The ACEC management plan, completed in 1991, addressed both the ACEC and a larger surrounding area where route designation was accomplished and recommendations were made for campground and trail improvements and

closure to target shooting. Hunting is allowed.

Red Mountain Spring (717 acres): This area was designated as an ACEC by the CDCA Plan to protect prehistoric values. A 1982 CDCA Plan Amendment listed this area as closed to vehicle travel. A management plan was completed in 1987. This ACEC was included in the route designation inventory and designation process for the Red Mountain subregion. It was formerly called Squaw Spring.

Rodman Mountains Cultural Area (6,204 acres): A 1988 CDCA Plan Amendment established this ACEC to protect cultural resources. Most of it is within the Rodman Mountains Wilderness. Portions outside the wilderness are part of the Ord-Rodman route designation subregion. The site contains raptor nests and limited desert tortoise habitat. No management plan has been prepared.

Rose Springs (859 acres): An area surrounding Rose Springs in Inyo County was designated as an ACEC by the CDCA Plan to protect prehistoric values. Access is limited by a gate, which has been vandalized in the past. A management plan was prepared in 1985. It recommended closure of the ACEC to motorized vehicles. Access is via a transmission line road and the Los Angeles Aqueduct road.

Sand Canyon (2,609 acres): The Sand Canyon ACEC was established to protect riparian habitat and wildlife in a canyon on the eastern slope of the Sierra Nevada Mountains. It is one of the most diverse areas in the West Mojave for species of small mammals and supports a wide variety of reptiles and birds. Two species nearly endemic to the West Mojave are found within the ACEC: the Ninemile Canyon phacelia and the yellow-eared pocket mouse. The riparian habitat is important to migratory birds, including the willow flycatcher. An ACEC management plan was prepared in 1989.

Short Canyon (754 acres): The Short Canyon ACEC was established by an amendment to the CDCA Plan in 1988. Most of the ACEC lies within the Owens Peak Wilderness. The purpose of the ACEC is to protect the unusual vegetation and diverse flora. Short Canyon is known to support occurrences of Charlotte's phacelia (*Phacelia nashiana*), a limited-range plant whose distribution falls almost entirely within the western Mojave Desert. In addition, a significant population of the state-listed Mojave tarplant (*Deinandra* [*Hemizonia*] *mohavensis*) was detected in the canyon in 1998. A management plan was prepared in 1990. The primary management action was to exclude grazing from the ACEC. This measure has been implemented through fencing and placement of cattle guards.

Steam Well (41 acres): This ACEC protects historic and prehistoric values. It lies within the Golden Valley Wilderness in San Bernardino County.

Trona Pinnacles (4,055 acres): The 1989 management plan for the Trona Pinnacles ACEC focused on protection of the outstanding scenery and geological features of this area ten miles south of Trona. The site is used for commercial filming and sightseeing. At least one prairie falcon nest site was reported within the ACEC, but falcons have not been recorded there for the past ten years.

Western Rand Mountains (17,877 acres): The Western Rand Mountains ACEC formerly supported high densities of desert tortoises, though tortoise numbers have declined substantially from historical levels. The ACEC is believed to support the Mohave ground squirrel, and is known to harbor the burrowing owl and the LeConte's thrasher. A Rand Mountains Fremont Valley Management Plan was completed in 1993. This plan, which also addressed surrounding lands such as Koehn Lake and lands to the northeast, was prepared in cooperation with the CDFG under authority of the Sikes Act. It received a "no jeopardy" Biological Opinion from the USFWS. The plan recommended several amendments to the BLM's CDCA Plan:

- Expand the West Rand Mountains ACEC by 13,120 acres
- Change Class M lands in the ACEC expansion and adjacent alluvial fan areas to Class L.
- Withdraw 32,590 acres within the Rand Mountains – Fremont Valley management area from mineral location and entry. The 6,090-acre Koehn Lake and an additional 8,320 acres within the management area will remain as class M and open to mineral entry.
- Close the entire management area to off highway vehicle use except for 129 miles of designated open routes.
- Categorize portions of the Rand Mountains – Fremont Valley management area as Desert Tortoise Category I habitat. These lands lie on both sides of the Randsburg-Mojave Road southwest of Red Mountain and are shown on Illustration #9 illustrated in the 1993 management plan.

The Rand Mountains Fremont Valley Management Plan reduced the number of open routes by 90%. Signs were installed to identify open and closed routes of travel. All open routes and many, but not all, closed routes were signed. In selected areas, hay bails and plastic safety fencing have been used to stop motorcycle use on closed routes or to stop cross-country travel. Hay bales and fencing have been more effective in reducing non-compliance that signs alone.

The plan established a goal of ranger patrols eight hours per week plus eight hours each weekend from March 1 to June 30, September 1 to November 1, and holiday weekends. Ranger staffing levels have not increased sufficiently to fully achieve this goal over the entire period since the plan was approved in 1993. During 2002, one Ranger was assigned primary patrol responsibilities for the Rand Mountains, Fremont Valley and the Desert Tortoise Natural Area. Patrol effort for the region is now meeting the management goal.

3.1.1.3 Wilderness Areas

By enacting the California Desert Protection Act of 1994, Congress designated 69 wilderness areas in southern California and directed that they be administered by the BLM pursuant to the Wilderness Act of 1964. Seventeen of these areas are within or partially within the planning area. Table 3-2 lists these 17 wilderness areas, together with the amount and

percentage of public land ownership within each. For a detailed description of each wilderness area, see Appendix E.

Table 3-2
Wilderness Areas Within The
Western Mojave Planning Area

WILDERNESS NUMBER	WILDERNESS AREA	PERCENT PUBLIC LAND	PUBLIC LAND ACRES	TOTAL ACRES
55	Argus Range	95.8	17,493	18,262
23	Bighorn Mountain	99.6	26,681	26,790
39	Black Mountain	98.2	20,542	20,929
44	Bright Star	97.3	7,824	8,042
22	Cleghorn Lakes	82.6	32,857	39,798
63	Coso Range	94.2	49,295	52,320
65	Darwin Falls	92.0	7,935	8,620
43	El Paso Mountains	97.5	23,675	24,278
41	Golden Valley	99.6	36,487	36,515
39	Grass Valley	91.1	29,904	32,835
45	Kiavah	87.9	18,201	20,703
35	Newberry Mountains	73.2	20,300	27,746
51	Owens Peak	95.4	46,733	49,009
41	Rodman Mountains	86.8	29,782	34,315
54	Sacatar Trail	99.6	33,078	33,132
20	San Gorgonio	61.2	25,403	41,528
21	Sheephole Valley	96.3	32,625	33,891
	TOTAL	**90.1**	**458,814**	**508,715**

The purpose of wilderness, as defined in section 2(a) of the Wilderness Act, is "...to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas in the United States ... leaving no lands designated for preservation and protection in their natural condition....". Further, wilderness is defined in Section 2(c) of the Wilderness Act to be areas "...where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions..."

Section 4(c) of the Wilderness Act prohibits certain uses of wilderness. These prohibitions include commercial enterprise, permanent roads, temporary roads, use of motor vehicles, motorized equipment or motorboats, landing of aircraft, use of other forms of mechanical transport, and structures or installations. There are three classes of exceptions to some or all of the prohibitions. These include private existing rights (e.g., rights associated with a lease for a microwave tower that existed at the time of wilderness designation), actions necessary to meet the minimum requirements for the administration of the area, (e.g., use of motorized equipment to remove hazardous materials), and "Special Provisions" (e.g., livestock grazing that was established prior to designation).

The California Desert Protection Act, at Title I for BLM Wilderness, provides for motorized vehicle access for (1) fish and wildlife management activities by appropriate State agencies and (2) law enforcement. At Title VII, the CDPA establishes explicit federal water rights, allows access for Indian religious purposes, and provides mandates and procedures for acquiring State and private inholdings.

Wilderness areas include important habitat of several West Mojave species of concern. Foremost among these are the bighorn sheep, prairie falcon, and golden eagle. The majority of the known golden eagle and -prairie falcon nest sites are within Wilderness. Desert tortoises are found at the edges of several wilderness areas, such as the Newberry Mountains and Rodman Mountains.

Five of the 17 Wilderness Areas are encompassed or partially encompassed within critical tortoise habitat. These include the Rodman Mountains, Newberry Mountains, Black Mountain, Grass Valley and portions of Golden Valley wilderness areas. The overlap of wilderness areas with critical habitat for other species is not yet determined, but the acreage is estimated to be small.

3.1.1.4 Land Tenure Adjustment Program

In January 1991, BLM adopted a "Western Mojave Land Tenure Adjustment Program," (LTA Program) developed jointly with Edwards Air Force Base and the County of San Bernardino. The purpose of the LTA program was to address potential conflicts surrounding the development of private lands adjacent to public lands and beneath airspace utilized by EAFB. The agencies were concerned (1) that such development could impact the management of natural resources on adjacent public lands, and (2) that Air Force use of airspace above high-density residential developments on private land could lead to public noise and safety complaints.

To prevent these conflicts from arising, the LTA Program proposed a voluntary land acquisition program based on the exchange of scattered parcels of public lands near urban centers for private inholdings in more remote areas. The LTA Program identified Consolidation Zones where exchange-based land acquisition would be focused, Disposal Zones composed of scattered public land parcels to use as an "exchange base", and Retention Zones, wherein the current land ownership pattern would be maintained.

The 1991 Record of Decision indicated BLM's intent to dispose 105,000 acres of public land, acquire 255,000 acres and retain 417,000 acres. Of the 672,000 acres of public lands either to be retained or acquired, 620,000 would be classified as "Multiple Use Class L", and 52,000 acres would be classified as "Multiple Use Class M"; no unclassified lands would remain within the LTA project area. By mid-2001, BLM had acquired 61,247 acres within the LTA project area. These were obtained through exchanges for public lands within the Disposal Zone, such as mineralized public lands in and adjacent to the U. S. Borax mine at Boron. (Bureau of Land Management, Annual Report to Edwards Air Force Base, August 15, 2001.)

As of March 2004, BLM had acquired 61,247 acres through the LTA program. In exchange, BLM has provided 18,359 acres to non-government entities.

3.1.2 Other State and Federal Agencies

3.1.2.1 United States National Park Service

The National Park Service manages 294,500 acres within the southern reach of the planning area. This is the northern half of Joshua Tree National Parkwhere Mojave Desert vegetation and wildlife prevail before entering the transition to the somewhat different conditions found in the Colorado Desert subdivision of the Sonoran Desert. Conservation management within JTNP is important for protection of the adjacent Pinto DWMA for the desert tortoise, bats, the Mojave fringe-toed lizard, the Little San Bernardino Mountains gilia, bighorn sheep, and a diversity of more common desert plants and wildlife.

3.1.2.2 California Department of Fish and Game

CDFG has acquired lands throughout the western Mojave Desert by direct purchase for wildlife conservation or by acceptance of mitigation and compensation lands from land developers. CDFG owns a total of 14,550 acres within the planning area. The location and status of these lands is described below.

Camp Cady Wildlife Area (1,552 acres): Camp Cady is a riparian oasis on the Mojave River, located between Barstow and Afton Canyon. The CDFG manages this site for wildlife protection, and it serves as a refugium for the endangered Mojave tui chub, an endemic fish. The mesquite thickets and riparian forest support a number of declining bird species, including Lucy's warbler, yellow-breasted chat, yellow warbler, summer tanager and LeConte's thrasher (Schroeder, 1993, Tennant, 2002). The highest numbers of Lucy's warbler within the western Mojave Desert occur at Camp Cady, and this site is important for nesting and wintering raptors, including golden eagle, prairie falcon, and ferruginous hawk. The western portion of Camp Cady contains sand dunes and hummocks supporting the Mojave fringe-toed lizard.

Studies of the vegetation and hydrology at Camp Cady have shown a decline in the vigor of the riparian habitat, including stress and failure in reproduction of mesquite thickets. Lowering of the groundwater table during the spring is the identified cause (Lines, 1999).

Fremont Valley Ecological Reserve (1,090 acres): The CDFG owns five properties within desert tortoise critical habitat in the Fremont Valley. The lands are managed for conservation of the desert tortoise and Mohave ground squirrel. Other species, including LeConte's thrasher, Barstow woolly sunflower and desert cymopterus may occur, but have not been verified.

Hinkley Conservation Easement (7.5 acres): CDFG owns a conservation easement on a parcel near Hinkley Road south of Highway 58 about nine miles west of Barstow.

Indian Joe Spring Ecological Reserve (546 acres): The Indian Joe Spring Ecological Reserve consists of a parcel in a canyon of the Argus Range in Inyo County. This area contains significant riparian habitat and protects the endangered Inyo California towhee. Other riparian birds utilize the canyon during migration and for nesting, and both nesting and communal roost habitat is present for the long-eared owl. The surrounding lands provide nest sites for prairie falcon and golden eagle, and the water in the canyon supports a healthy population of quail and chuckar.

Indian Wells Valley Mitigation Lands (80 acres): CDFG obtained a parcel adjacent to Little Dixie Wash in Kern County with known occupied habitat for the desert tortoise, Mohave ground squirrel, and LeConte's thrasher.

King Clone Ecological Reserve (488 acres): A reserve was established to protect ancient creosote bush vegetation, including the oldest known specimen, a circular shrub estimated to be 11,700 years old. This reserve is surrounded by the BLM's Johnson Valley Open Area north of Lucerne Valley and has been fenced.

West Mojave Desert Ecological Reserve (11,817 acres): CDFG owns 22 properties north of Highway 58 between Barstow and Kramer Junction. These lands are within desert tortoise critical habitat and the Fremont-Kramer DWMA. The reserve contains occupied habitat for desert tortoise, Mohave ground squirrel, LeConte's thrasher and Barstow woolly sunflower. Other target species (e.g. desert cymopterus) may occur but have not been verified.

3.1.2.3 California Department of Parks and Recreation

The California Department of Parks and Recreation owns 25,400 acres that it operates as State Parks in four separate units. In addition, the CDPR's Division of Off-highway Vehicles contributes funds annually to maintain and monitor BLM Open Areas. The conservation lands affording protection to species addressed by the West Mojave Plan are described below.

Antelope Valley California Poppy Reserve: Located within Los Angeles County 15 miles west of Lancaster, the 1,750 acre Antelope Valley California Poppy Reserve protects extensive wildflower fields and receives thousands of visitors annually. The park is fenced to exclude grazing and prescribed burns are conducted to maintain the habitat. The reserve also supports nesting burrowing owls and provides wintering habitat for a variety of raptors, including the golden eagle, prairie falcon, northern harrier, and ferruginous hawk.

Red Rock Canyon State Park: The Park encompasses the southwestern portion of the El Paso Mountains, and was established for protection of outstanding scenic values and wildlife habitat. Within the 26,000-acre park is the majority of the range of two narrow endemic plant species, the Red Rock poppy and the Red Rock tarplant. The tarplant is listed as endangered by the State of California. The mountainous terrain contains nest sites for prairie falcons, and two unique alkali seeps support the alkali mariposa lily. Red Rock Canyon State Park provides a linkage between BLM lands to the east and west, and lies within the proposed Mohave Ground Squirrel Conservation Area.

Ripley Joshua Tree Woodland: The state established the 566 acre Ripley reserve to protect a Joshua tree and juniper woodland. This natural community has nearly disappeared in the Antelope Valley. Most of the site is fenced, and restoration efforts are underway.

Saddleback Butte State Park: Protection of Joshua tree woodland was the reason for establishing the 3,336-acre Saddleback Butte State Park. The desert floor surrounding the buttes has blowsand soils that support the westernmost population of the Mojave fringe-toed lizard and exhibits an outstanding display of wildflowers in wet years. Birds of prey nest on the buttes, and the Mohave ground squirrel is found on some of the surrounding lands to the north.

3.1.2.4 California Department of Transportation

Caltrans has been a major provider of protected habitat in the state for the past several years. Caltrans purchases replacement habitat as compensation for loss due to highway improvements, including some of the CDFG lands northeast of Kramer Junction. These commitments normally are specified as terms and conditions of biological opinions from the USFWS to the Federal Highways Administration (FHWA), which provides federal funding to major Caltrans projects, and as requirements associated with 2081 permits from CDFG.

3.1.3 Local Jurisdictions

Counties, cities and towns have land use planning authority over private lands in the West Mojave planning area. California law requires that local jurisdictions adopt and maintain a general plan as a guide to future development within their communities. The general plan includes a land use element that describes the distribution and intensity of land uses expected to develop within the jurisdiction over time, as well as a conservation element that establishes policy for the management of natural resources, including biological resources.

Cities and counties are required to conduct environmental review of development projects proposed within their jurisdictions pursuant to the California Environmental Quality Act. This review includes an assessment of the proposed development's affect on biological resources. In addition, some jurisdictions have adopted ordinances that establish biological mitigation requirements for ministerial permits not subject to CEQA. Figure 3-1 provides an overview of the existing review process for development projects that have the potential to affect listed or sensitive species. This process may vary somewhat by jurisdiction.

Following is a summary of existing development patterns, land use and conservation policies directing future development in the West Mojave's cities and counties.

3.1.3.1 Inyo County

Most of the private land available for development is located along the Highway 395 corridor. According to the county's 1984 General Plan Land Use Element, future population growth is expected to occur primarily in the Owens Valley. The Olancha area, at the very northern end of the planning area, has been designated by the General Plan as an urbanizing area

with a full range of urban land use types including residential, commercial and industrial uses. The highest residential densities planned for this area are Rural High (one acre minimum parcel size) and Rural Medium (2 ½ acre minimum parcel size). Existing and planned development at Haiwee, Dunmovin, Coso Junction, and Little Lake is oriented towards highway service commercial, residential densities of one-acre minimum parcel size and greater, and agricultural activities. The Homewood Canyon area of the county has been designated for residential use at densities ranging from one dwelling unit per five to ten acres.

Land use goals for the county include creating opportunities for reasonable expansion of communities in a logical and contiguous manner, while providing and protecting open space areas; guiding growth to areas where services can accommodate urban growth; providing a range of commercial and industrial land uses to meet future needs; promoting recreation and a diverse tourist industry; and maintaining and expanding the county tax base.

The 1981 Conservation and Open Space Element of the county general plan, at page 22, has the following goal pertinent to biological resources: "Protect, conserve, develop and utilize natural resources, while at the same time protecting the environment."

The Inyo County General Plan also provides for the designation of Environmental Resource Areas (ERA) where special management attention is provided to protect the most important and critical environmental resources. Several sites within the planning area have been designated as ERAs including the Argus Bighorn Sheep Range, Haiwee Botanical Area, China Lake Naval Weapons Center, Rose Spring, and Little Lake-Fossil Falls. Residential densities for private lands within these areas are limited to one dwelling unit per 40 acres. Several general plan policies are established for the ERAs that support cooperation between public agencies, encourage additional wildlife studies, encourage development and maintenance of fisheries, retention of riparian vegetation and management of riparian areas under principles of multiple use. (Conservation and Open Space Element of Inyo County Plan at pages 31 through 37.)

3.1.3.2 Kern County

Most of the urbanized development within the unincorporated desert area of the county occurs around Mojave, Rosamond, and the Indian Wells Valley area near Ridgecrest. The Land Use, Open Space and Conservation Element of the County General Plan calls for the development of urban densities only in areas reasonably capable of receiving public services or alternative septic systems and encourages (1) higher density residential in urban areas near commercial facilities, (2) a variety of housing types and price ranges; and (3) the clustering of development as a means of preserving open space. A density bonus of 20% over general plan densities is allowed for residential development that provides complete public infrastructure improvements (County General Plan Land Use, Open Space, and Conservation Element at 5-2 through 5-3). Lower density residential, resource and agricultural uses exist throughout most of the remaining area.

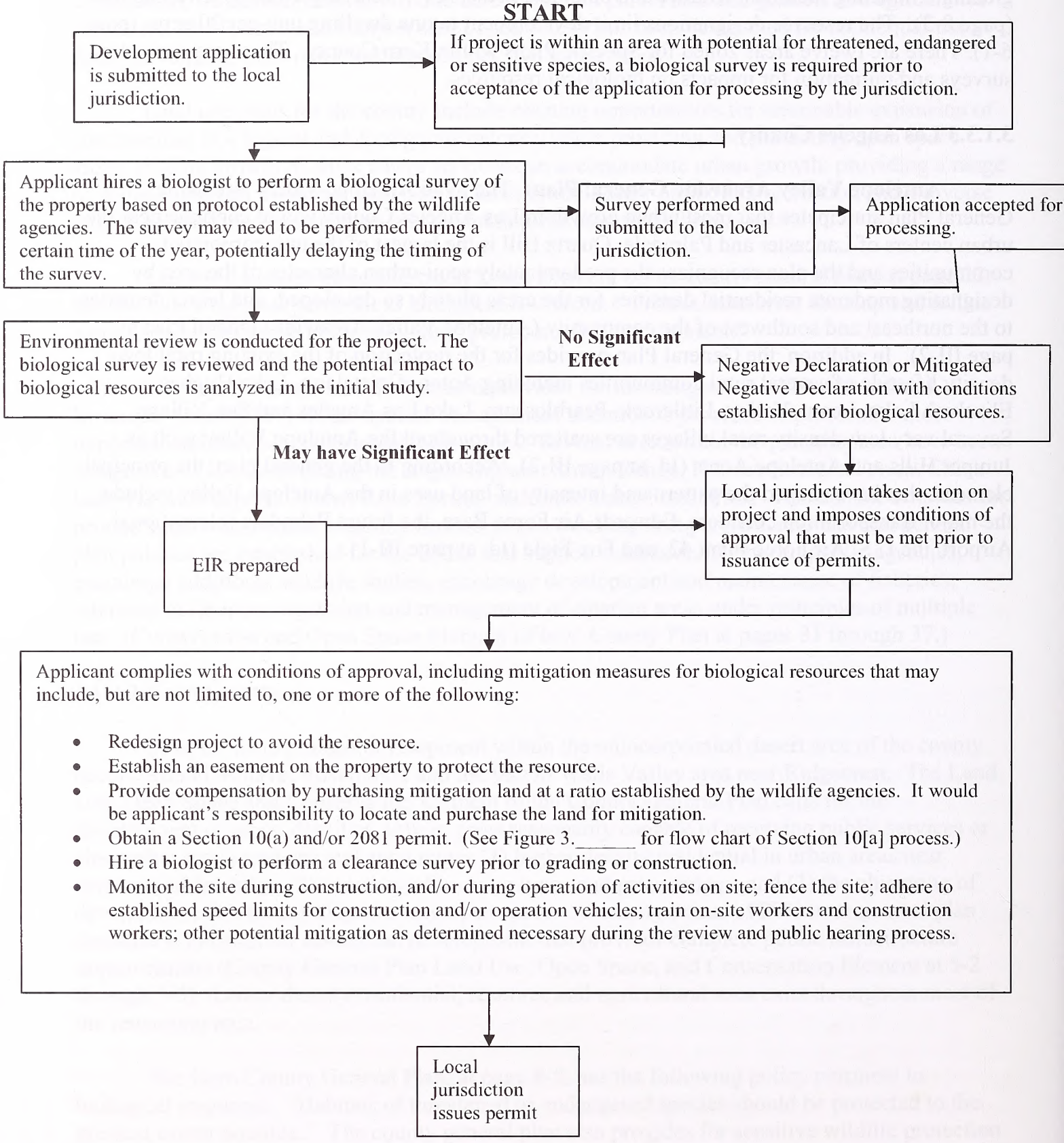
The Kern County General Plan, at page 8-5, has the following policy pertinent to biological resources: "Habitats of threatened or endangered species should be protected to the greatest extent possible." The county general plan also provides for sensitive wildlife protection

through "resource use" designation. Three resource areas list wildlife and botanical preserves among their primary permitted uses: Resource Reserve, Extensive Agriculture and Resource Management Areas. The Resource Management Areas include important open space lands and wildlife habitat (page 8-3). These areas are primarily for "recreational activities, livestock grazing…ranching facilities, wildlife and botanical preserves … one single-family dwelling unit" (page 8-3). The resource designations limit development to one dwelling unit per 20 acres (page 6-1). There are twelve areas zoned for Specific Plans within Kern County. These areas require surveys and mitigation for impacts on biological resources.

3.1.3.3 Los Angeles County

Antelope Valley Areawide General Plan: The 1986 Antelope Valley Areawide General Plan anticipates that most urban growth in Los Angeles County would continue near the urban centers of Lancaster and Palmdale. Quartz Hill is the largest of the unincorporated communities and the plan recognizes the predominately semi-urban character of the area by designating moderate residential densities for the areas already so developed, and lesser densities to the northeast and southwest of the community (Antelope Valley Areawide General Plan at page III-2). In addition, the General Plan provides for the protection of the existing rural low-density lifestyle of several rural communities including Acton, Crystalaire, Lake Hughes-Elizabeth Lake, Leona Valley, Littlerock, Pearblossom, Lake Los Angeles and Sun Village. Several very low-density rural villages are scattered throughout the Antelope Valley such as Juniper Hills and Antelope Acres (Id. at page III-2). According to the general plan, the principal elements that have shaped the pattern and intensity of land uses in the Antelope Valley include the major transportation corridors, Edwards Air Force Base, the future Palmdale International Airport, the U.S. Air Force Plant 42, and Fox Field (Id. at page III-1).

Figure 3-1
Typical processing Steps for Projects on Private Land with Potential for Endangered, Threatened or Sensitive Species



Significant Ecological Areas: There are a number of areas designated by the Antelope Valley Areawide General Plan as "Significant Ecological Areas" due to their unique plant and/or animal resources. Development within these areas is permitted by the general plan at very low intensities subject to standards providing for the protection of the resources. The general plan recommends that several areas be acquired by an appropriate public agency as permanent ecological preserves, including the Little Rock Wash, Big Rock Wash, Portal Ridge/Liebre Mountain, Tehachapi Foothills SEAs, and areas adjacent to the Califonia Poppy Preserve among others (Id. at pages III-3 and 4). There are 13 SEAs within the planning area. These include:

- SEA #47 – Edwards Air Force Base.
- SEA #48 – Big Rock Wash.
- SEA #49 – Little Rock Wash.
- SEA #50 – Rosamond Lake.
- SEA #51 – Saddleback Butte State Park.
- SEA #52 – Alpine Butte.
- SEA #53 – Lovejoy Butte.
- SEA #54 – Piute Butte.
- SEA #55 – Desert-Montane Transect.
- SEA #56 – Ritter Ridge.
- SEA #57 – Fairmont and Antelope Buttes.
- SEA #58 – Portal Ridge/Liebre Mountain.
- SEA#60 – Joshua Tree woodland habitat.

The SEAs at Big Rock Wash, Piute Butte, Alpine Butte, and Portal Ridge/Liebre Mountain provide important linkages and wildlife corridors.

The County is revising its general plan, and a proposal to combine the SEAs into three larger units is being reviewed. One SEA, Kentucky Springs, near the southwest boundary of the planning area, would be deleted. Formal action on the SEA proposals would not take place until after the West Mojave Plan is completed, and may consist of retention of the existing boundaries and land use standards, adoption of the consultant's recommendations, or revisions to the recommendations and standards as a result of public input and staff analysis. These new SEA proposals include the following:

- **Antelope Valley:** The Antelope Valley SEA would combine nine existing SEAs (Desert-Montane transect, Big Rock Wash, Little Rock Wash, Piute Butte, Alpine Butte, Saddleback Butte State Park, Lovejoy Butte, Rosamond Lake and Edwards Air Force Base) into a single designation. This area would extend from the Los Angeles-San Bernardino County line near Llano west to Little Rock Creek and from the Forest Service boundary north to Saddleback Butte State Park and just north of the southern boundary of Edwards Air Force Base. Portions of the SEA along Little Rock Creek, Big Rock Creek and Mescal Creek would extend into the Angeles National Forest. The proposed area comprises 222,325 acres, including 197,634 acres of unincorporated Los Angeles County, 9,887 acres within Angeles National Forest, 11,074 acres within the City of Palmdale and 3,730 acres within the City of Lancaster. Acreage of the recommended

SEA within EAFB was not specified, and a small unspecified acreage of BLM managed lands is also included. The County would have no permitting or land use authority over lands outside the unincorporated area.

The recommended SEA was designed to protect watersheds supplying the Rosamond and Rogers Lake playas as well as the desert buttes in the eastern Antelope Valley. The SEA contains riparian habitats, mesquite bosques, playa lakes, and seasonal pools. Portions of the SEA overlap the proposed Alkali Mariposa Lily Conservation Area and the Big Rock Creek Conservation Area, where gray vireo, San Diego horned lizard, short-joint beavertail cactus, and a number of riparian birds are found.

Wildlife corridors and habitat linkages between the San Gabriel Mountains and the Antelope Valley desert areas are included within the proposed SEA. The buttes support nesting birds of prey, including prairie falcon. The SEA would protect occupied habitat and the ecosystem processes of sand transport for the Mojave fringe-toed lizard.

- **Joshua Tree Woodland:** A proposed SEA of 4,732 acres would include undisturbed portions of existing SEA Number 60 (Joshua Tree woodland habitat) and make boundary corrections. All of the land is within uncorporated Los Angeles County, and is privately owned, with the exception of the California Aqueduct.

  This proposed SEA would include remnant stands of Joshua tree woodland, and contains potential habitat for burrowing owl and known foraging habitat for several species of raptors, including prairie falcon, golden eagle, and ferruginous hawk.

- **San Andreas Rift Zone:** The proposed San Andreas Rift Zone SEA extends from the westerly foothills of the Tehachapi Mountains in a southeasterly direction along the San Andreas Fault to include the foothills of Liebre Mountain and Sawmill Mountain, most of Portal Ridge, Leona Valley, Ritter Ridge, Fairmont and Antelope Buttes, Anaverde Valley and Lake Palmdale. A separate area surrounds Barrel Springs. It covers 89,698 acres, including 68,722 acres in unincorporated Los Angeles County, 15,285 acres in Angeles National Forest, 5,476 acres within the City of Palmdale and 215 acres within the City of Lancaster. The state Antelope Valley California Poppy Reserve is included within the SEA. Three small BLM managed parcels on Portal Ridge are also included. The County would have no permitting or land use authority over lands outside the unincorporated area.

  The proposed SEA would combine and modify the existing SEAs for Ritter Ridge, Fairmont and Antelope Buttes and Portal Ridge/Liebre Mountain.

  The SEA would include occupied habitat for the red-legged frog, southwestern pond turtle, short-joint beavertail cactus, San Diego horned lizard, burrowing owl, least Bell's vireo and potentially other target species of the West Mojave Plan. An important linkage between the Angeles National Forest and the Antelope Valley California Poppy Reserve would be included. Uncommon or rare wetland communities, wildflower fields, and native grasslands are also present.

Wildlife and Wildflower Sanctuaries: The Los Angeles County Department of Regional Parks owns several scattered tracts of land that are managed as wildlife and wildflower sanctuaries and are zoned as open space. Some of these sanctuaries are within existing SEAs or the proposed Antelope Valley SEA. Others are within the proposed Big Rock Creek or Mohave ground squirrel conservation areas, and one is within a proposed DWMA.

- Butte Valley Wildflower Sanctuary – 320 acres within proposed SEA and MGS CA
- Gerhardy Wildlife Sanctuary – 320 acres
- Payne Wildlife Sanctuary – 320 acres within existing SEA #55
- Mescal Wildlife Sanctuary– 100 acres within existing SEA #55
- Alpine Butte Wildlife Sanctuary– 320 acres within existing SEA #52
- Desert Butte Wilderness –within existing SEA #53
- Pinyon Hills Wildlife Sanctuary –within existing SEA #55
- East Bob's Gap Nature Preserve
- Longview Wildlife Sanctuary
- Littlerock Wildlife Sanctuary
- Phacelia Wildlife Sanctuary –within proposed SEA and DWMA

3.1.3.4 San Bernardino County

Development and land disturbance within the unincorporated areas is located primarily around the incorporated cities, near the foothills of the San Bernardino Mountains (Phelan, Oak Hills, Pinion Hills, Lucerne Valley), in the Morongo Basin and areas south of the Marine Corps Air Ground Combat Center at Twentynine Palms, and east of Barstow in the Newberry Springs Area.

San Bernardino County General Plan: The San Bernardino County General Plan divides the desert region of the county into five subregional planning areas that are coterminous with the boundaries of five Regional Statistical Areas (RSAs) for the desert portion of San Bernardino County. The County General Plan anticipates very little growth to occur within the Baker Subregional Plan Area (RSA31). The plan cites the lack of infrastructure facilities as a major constraint to development in this subregion, and expects the little growth that occurs to be around the existing communities of Newberry Springs, and the Searles Valley (San Bernardino County General Plan at page III-D1-1). Within the Barstow Subregional Planning Area (RSA 32a), the plan anticipates most of the future growth to occur in the incorporated City of Barstow and in Lenwood and other adjacent unincorporated communities (Id. III-D2-1). The San Bernardino County General Plan identifies the Victor Valley Subregional Planning Area (RSA 32b) as one of the fastest growing areas in San Bernardino County, with most of the growth occurring within the incorporated cities with long term development potential identified for the unincorporated areas of Phelan and Lucerne Valley (Id. at page III-D3-1). Most of the development within the Morongo Basin Subregional Planning Area (RSA 33) is concentrated in the Town of Yucca Valley and the city of Twentynine Palms, with scattered development occurring within the unincorporated areas (Id. at page III-D4-1). General Plan land use designations and densities generally reflect the growth patterns described above. Densities range from urban residential (maximum of 16 dwelling units per acre) to resource conservation with a

maximum density of one dwelling unit per 40 acres. Much of the unincorporated area is designated for low-density residential use ranging from one dwelling unit per 2.5 acres to one dwelling unit per 40 acres.

The County General Plan also includes mapping which ties allowable land uses to the availability of the basic infrastructure required for development (roads, water and wastewater facilities). "Required levels of service are established for all areas ranging from the most intense urban areas (IL 1) to the least intense rural areas (IL 5). Development can be permitted to the degree allowed by a site's official land use designation only when infrastructure facilities are or planned to be in place at levels consistent with the designated IL areas." (San Bernardino County General Plan at II-D6-36.)

The San Bernardino County General Plan lists the following goals and policies pertinent to biological resources:

- Preserve rare and endangered species and protect areas of special habitat value; and
- Establish plans for long-term preservation and conservation of biological resources (San Bernardino County General Plan at II-C1-4).

San Bernardino County Development Code: The San Bernardino County Development Code also provides for the designation of a Biological Resource Overlay District where special management is provided for unincorporated areas in the county for the protection of important flora/fauna habitat. Surveys and mitigation measures are required for any new development or expansion of an existing land use by 25% or more (Development Code at Section 85.030220). The County has categorized desert tortoise habitat as one, two, and three; indicated Mohave ground squirrel range; and identified bald eagle roosts and habitat on the Biotic Resource Overlay. (San Bernardino County General Plan at II-C1-4 to 6).

Surveys of biotic resources on site and adjacent parcels and mitigation measures to reduce impacts to the identified resources are required in the Biotic Resource Overlay Districts for all proposed land use map changes and for discretionary land use proposals. These development policies are not restricted to those areas within the Biotic Resource Overlay District, but may be applied to any areas where there are listed or candidate species and their habitat. A monitoring program is also required. Survey results, mitigation and monitoring must be documented in a Biological Resources Report.

Mojave Narrows Regional Park: The Mojave River flows through the Victor Valley, forming the boundary between the cities of Victorville and Apple Valley. At the Narrows, groundwater is forced to the surface by underlying bedrock and a permanent stream supports extensive riparian forest. This oasis provides habitat for many West Mojave target species, particularly birds. The concentration of species at this location makes the Mojave Narrows Regional Park a biological hotspot, where 17 sensitive species are found together. The park is owned by the state Wildlife Conservation Board and is operated by San Bernardino County Department of Regional Parks. It comprises 850 acres, with 450 acres devoted to habitat.

Mojave River Forks Regional Park: At the junction of Deep Creek and the Mojave River in Hesperia, San Bernardino County manages a campground park through a contractor. Much of this facility is vacant land providing undisturbed habitat.

3.1.3.5 City of Adelanto

The City of Adelanto is located within San Bernardino County on the northern side of the Victor Valley. The city is bisected by U.S. 395, which runs north/south through the city. The City of Adelanto General Plan (1994) characterizes the city as having a very pro-active city government that is not only pro-growth, but that has provided leadership in establishing a positive environment for investment within the city (City of Adelanto General Plan Update at I-3). The general plan for the city anticipates a high rate of growth over the next several decades. The areas along U. S. Highway 395, Palmdale Road and the eastern segment of El Mirage Road are planned for general commercial uses. The land area located between Mojave Drive and Air Base Road is planned for manufacturing and industrial uses. Residential areas in the southern portion of the city are planned at a density of about four dwelling units per acre. Multiple family residential areas are planned west of Highway 395 north of Air Base Road, intermingled with single-family densities at four dwelling units per acre. Low-density residential development (one dwelling unit per 2.5 to 5 acres) is planned for the area generally east of Koala Road and north of Air Base Road. The plan also designates 871 acres of land within the city as Open Space/Public Land/Schools (Id. at III-12).

The Conservation/Open Space Element of the Adelanto General Plan establishes the goal of assuring "...adequate protection and conservation of all native vegetation and wildlife habitats" (Id. at VII-26). General Plan policies indicate: "...the City will only allow development which minimizes the destruction of biotic resources within the City, such as the Mojave River Corridor." Other policies calls for retaining areas of the Shadow Mountains as open space to protect their integrity as a unique habitat as well as a wildlife movement corridor, and for maintaining major stream courses as open space to be managed as wildlife movement corridors. The General Plan suggests use of preferential assessments on real property as an incentive for retaining open space or conservation easements to protect sensitive species and their habitats (Id. at VII-27 through 29).

3.1.3.6 Town of Apple Valley

The Town of Apple Valley is located within San Bernardino County, south and east of Interstate 15 in the Apple Valley. The town is directly east of the city of Victorville and northeast of the city of Hesperia. Highway 18 bisects the city. The 1991 Town of Apple Valley General Plan characterizes the town as "...primarily a community of homes, many of which are located on lots of approximately half-acre or more." (Town of Apple Valley General Plan at page 25.) Residential densities ranging from one dwelling unit per 0.9 acres to one dwelling unit per 1.0 to 2.5 gross acres predominate in the central and southern portions of the town, while low to very low density areas (one dwelling per one to five gross acres or more) exist in the northeastern and southernmost portions of the community. Commercial development is focused along Highway 18 and Bear Valley Road. A significant portion of the northern part of the town is designated as Community Reserve, which encourages the development of mixed-use or large-

scale developments through specific plans with a residential density not to exceed two dwelling units per gross acre (Id. at page 9).

The Open Space/Conservation Element of the town general plan establishes a goal to "…conserve and protect natural resources within the planning area." Goal OSC-2 states: "The Town will make every effort to preserve significant mature native trees, native vegetation, landforms and wildlife habitat within the planning area" (Id. at page 9 and 10). Rock knolls in the town, Bell Mountain, Fairview Mountain, Apple Valley Country Club and the Mojave River Valley are identified as Open Space and are planned to remain in a natural condition (Id. at page 17). The objectives of Open Space Districts (OSD) include "the preservation of … native vegetation … and wildlife habitat" and "the preservation of the integrity, function, productivity and long-term viability of environmentally sensitive habitats" (Apple Valley Code at Section 9.55.020). The Apple Valley Code allows the designation of both Conservation and Recreation OSDs. Conservation OSDs are intended in part to "assure the continued existence of adequate wildlife habitat and foster the free movement of wildlife within the desert" (Id. at Section 9.55.020).

The **Lewis Science Center** is a regional educational facility located on the north side of the Mojave River in Apple Valley. The Center provides training for teachers from throughout the western portion of San Bernardino County and hosts many classroom visits. Riparian and adjacent upland habitat is protected at this location, including rock outcrops and portions of a levee that support the endemic Mojave shoulderband snail.

3.1.3.7 City of Barstow

The City of Barstow is located in San Bernardino County along the Mojave River at the intersection of Interstates 15 and 40. The Land Use Element of the City of Barstow General Plan (1996) identifies six Principal Growth Areas where most of the city growth over the next 20 years is expected to take place. The city has set general plan designations to accommodate this growth. The growth areas are as follows (City of Barstow General Plan at Part B, I.18 and 19):

- **Growth Area 1**: Most of the expected residential and associated neighborhood commercial activity is expected to occur adjacent to Barstow Road, between Rimrock Road and the southerly city limits. Barstow Community College and the California Veterans Home are located in this area.

- **Growth Area 2:** "Wholesale to the public" retailing outlets are expected to expand to the south along the east side of Interstate 15 from the existing outlet malls at Lenwood Road and 1-15.

- **Growth Area 3:** The Lenwood Specific Plan area located on either side of Lenwood Road, north of Interstate 15 is planned for new industrial and commercial activity.

- **Growth Area 4:** The area along the railroad between Highway 58 and West Main Street is expected to have commercial and industrial growth. Distribution activities and visitor

oriented commercial uses are expected to predominate.

- **Growth Area 5:** The area north of the Mojave River in proximity to Highway 58 is expected to have commercial activity adjacent to the freeway access point, with low-density residential developments nearby.

- **Growth Area 6:** The area just north of the Mojave River and east of Interstate I-15 has the potential for a golf course with associated "executive estate" homes.

The city's general plan identifies several goals pertinent to biological resources. These goals include seeking to preserve the remaining biological resources in the planning area; conserving suitable habitat for threatened and endangered species whenever possible; establishing corridors for movement of wildlife between DWMAs and between tortoise critical habitat; striving to maintain native riparian and associated natural habitats along the Mojave River; and maintaining the Mojave River as a travel and watershed corridor to maintain the link between the natural areas to the north and south of the city. The general plan also identifies the need to perform site-specific studies prior to development to determine the mitigation necessary to preserve and enhance biological resources (City of Barstow, General Plan – Part B, II.9).

3.1.3.8 City of California City

California City is located in Kern County, north of Highway 58 and east of Highway 14. Nearly all of the existing development and population exists in an area comprising about twelve sections of land in the southwest corner of the city. Very limited development has occurred to the northeast in the vicinity of Twenty-Mule Team Road (California City General Plan 2012 at page 3). The general plan indicates that "approximately ninety percent of the subdivided land has been sold and more than ninety-five percent of the total land area remains empty, except for bladed roads and, in some cases, partial utilities." (Id. at page 22.)

Residential land use densities planned for the city range from Estate Density Residential densities of 2 to 5 dwelling units per acre, to high density residential (6 to 40 dwelling units per acre). General Commercial designations are shown along California City Boulevard, with Neighborhood Commercial dispersed in residential areas. Industrial development is planned in the western part of the city, primarily north of California City Boulevard near the airport. Several conservation areas are shown on the general plan, scattered throughout the eastern portion of the city. The General Plan text supports urban growth with emphasis placed on infill development of the central core. (Id. at page 24.)

The City is currently proposing a detachment of 12,450 acres in the northeastern part of the city; 1,846 acres adjacent to the Desert Tortoise Natural Area; and 4,144 acres in the south eastern part of the city. Coupled with the detachment is a request to annex 18,778 acres at the western end of the city stretching from the current city limits south to Highway 58. (Final Environmental Impact Report – Redevelopment Area Expansion, Detachment, Annexation, and Automotive Test Course Project, California City, October 4, 2002 at Figure 2.1-2-A.)

The Open Space and Conservation Element of the California City General Plan lists the following goals and policies regarding biological resources:

- Preserve and protect conservation resources of sensitive plant and wildlife species that are unique to California City environs (California City Plan at page 43).

- Protect sensitive plant and wildlife species, in accordance with State and federal laws and regulations, and provide for maintenance of supportive habitat for such species in balance with the needs of humans (Id. at page 44).

3.1.3.9 City of Hesperia

The City of Hesperia is located in the Victor Valley region of San Bernardino County, along Interstate 15, south of the City of Victorville and Town of Apple Valley. The City of Hesperia General Plan (at page L-6) indicates that most of the existing residential lots are located within the core area of the town, generally bounded by Maple Avenue and the Mojave River, and by Bear Valley Road and Ranchero Road. Within this area, lot sizes have historically ranged from 18,000 square feet to one acre in size. In 1991, the average residential lot size within Hesperia was approximately 39,000 square feet (CIC Research Inc., *A Citizen's Planning Survey for Hesperia, June 1989).* Large expanses of land within the core area were subdivided into half acre, acre and two-acre tracts prior to incorporation of the city. Many of these lots are configured in a way that makes further subdivision infeasible and densities are anticipated to remain fairly low (City of Hesperia General Plan at page L-9). Residential general plan designations range from Rural Estate (0.1 to0-.4 dwelling units per acre) to High Residential (8 to 15 dwelling units per acre). The general plan identifies a trend towards more traditional sized single family residential (3 to 6 dwelling units per acre) in the western portions of the city west of Maple Avenue (Id. at page L-7). Specific plans for large-scale planned developments have been approved for the southern portions of the city in Summit Valley.

General Plan Land Use Goals for the city emphasize the protection of quality of life; accommodating growth "...within the limits of the natural environment and the capacity of its infrastructure" and "...managing the use of land so that development occurs in an orderly and beneficial manner..." (Id. at L-4 and 5.)

The City of Hesperia General Plan goals relative to biological resources call for preservation of sensitive or protected desert vegetation and animal species, and habitat areas throughout the planning area; conducting a biological assessment to identify sensitive habitat areas; and a site specific assessment of the impacts of a proposed development on biological resources (Id. at CN-26-27). The general plan also indicates that "biological resource conservation measures, including preparation of a habitat conservation plan for endangered species, designated preserve areas, and protection of Joshuas and other unique species, will be an integral part of planning within the City." (Id. at CN-7.)

The city has initiated a habitat conservation plan in cooperation with Caltrans, Rancho Las Flores and Summit Valley Ranch. The HCP would address potential impacts to three species, the arroyo toad, the southwestern willow flycatcher, and the Least Bell's vireo. The

HCP would include mitigation measures for the entire areas of the two specific plans as well as for the effects of the expansion of State Highway 138 to a four-lane road. As the specific plans and the State highway project were initiated and evaluated independently from the West Mojave Plan, mitigations would be applied outside of the parameters of the Plan, in accordance with the HCP and the indivisual environmental documentation for each project.

3.1.3.10 City of Lancaster

The City of Lancaster is located in the Antelope Valley region of Los Angeles County along Highway 14. Urbanized development in the city is concentrated in the central area of Lancaster and in the area surrounding the Quartz Hill community. The approval of large-scale developments in the eastern and western portions of the city has "set the stage for the development of several isolated nodes." The General Plan notes, "There is a considerable amount of undeveloped land between these development nodes and the urbanized areas of the City." These undeveloped lands are generally divided into 2.5 and 5.0-acre parcels, a land pattern that makes infill difficult. An area of mixed land uses is found in South Lancaster. Rural residential communities are found in the outlying areas of the city. (City of Lancaster General Plan at page VIII-2.)

The general plan specifies a range of residential land use densities from Nonurban Residential (up to 1 dwelling unit per 10 acres) to High Density Residential (15.1 to 30.0 dwelling units per acre). Land use goals include establishing a variety of land uses which further Lancaster's transition from a suburb of Los Angeles to a community with a full range of urban and community services; managing growth to create a comprehensive urban structure; encouraging infill development; protecting rural areas from urban encroachment; creating an aesthetically pleasing environment; and promoting a regional perspective in land use decisions. (Id. at pages VIII-5 through 38.)

The City of Lancaster General Plan (at page II-20) establishes an objective pertinent to biological resources to "Identify, preserve and maintain important biological systems within the study area, and educate the general public about these resources, which include the Joshua Tree – California Juniper Woodlands, areas that support endangered or sensitive species, and other natural areas of regional significance." Policies call for comprehensive management of programs for significant biological resources; cooperation with others in the development of the West Mojave Plan; the initiation of area wide studies to identify sensitive biological resources; protection of Prime Desert Woodlands through acquisition or other means; establishing standards for the development of property in Prime Desert Woodlands; and the preservation of significant desert wash areas and open space lands in and around the Poppy Preserve (Id. at pages II-20 through 27). There is one wash area (Little Rock Creek Wash) within the City limits, and it is designated Open Space.

The City is establishing a Joshua Tree Woodland Preserve. Forty acres have been acquired for the preserve, and 45 additional acres are being purchased. This area would serve as an educational outreach facility. It is not currently known what species are found at the Preserve. In 1991, the City passed Ordinance 577, which established fees for removal of native vegetation within defined Vegetative Management Areas. The fees collected under this ordinance are used

to offset the costs associated with acquiring sites within the Prime Desert Woodland.

3.1.3.11 City of Palmdale

The City of Palmdale is located in the Antelope Valley region of Los Angeles County, south of the City of Lancaster. The developed portions of the City "...occupy an area generally bounded by the Littlerock Wash on the east, the California Aqueduct on the south, and 70th Street West on the west." Littlerock Wash forms a natural boundary between urban residential densities in the City and more rural development in the unincorporated community of Littlerock. "The northern extent of urban development in Palmdale follows an irregular path from Avenue M in the northwest portion of the City, around existing rural residential areas in the north central portion of the Planning Area, and south of the airport land along Avenue P." (City of Palmdale General Plan at page L-40.) The large expanse of airport land (over 22,000 acres) in the north and northeastern portions of the city have helped to shape growth patterns. The airport land is largely vacant except for Air Force Plant 42, minor agricultural uses and sewage treatment facilities, but if future airport uses occur, the land would provide economic development opportunities for the City and is designated for manufacturing land uses by the general plan. (Id. at page 42.)

The City General Plan identifies the following development trends for the city:

- "New housing for first time buyers will be constructed on the east side of Palmdale (east of 47th Street)."
- "Residential Development will continue to expand south into the Barrel Springs and Vincent Hills Areas."
- "...The southwest portion of the City between Verde Ridge and the southern sphere line, west of Hwy 14 to City Ranch will be a target for urban development if infrastructure is provided."
- "City Ranch and Ritter Ranch will begin construction on initial phases adjacent to Elizabeth Lake Road."
- "The City will complete annexation of many of the County island areas within the core areas."
- The City will encourage infill of vacant land and reuse of existing buildings in urbanized areas..." (City of Palmdale General Plan at pages L-48 and L-49.)

Biological resources are addressed in the City's General Plan Goal ER2, which calls for protecting "...significant ecological resources and ecosystems, including, but not limited to, sensitive flora and fauna habitat areas." Significant Ecological Areas are identified at Big Rock Wash, Little Rock Wash, Ritter Ridge, Portal Ridge and Alpine Butte. Biological surveys are required for any new development in these areas, and significant environmental resources are required to be considered and preserved to the extent feasible. The plan also calls for the preservation of natural drainage courses and riparian areas containing significant concentrations of ecological resources, as well as significant Joshua tree woodlands.

3.1.3.12 City of Ridgecrest

The City of Ridgecrest is located in northeastern Kern County in the southern portion of the Indian Wells Valley. Scattered residential land uses predominate in the city with linear commercial land uses occurring along Inyokern Road, China Lake Boulevard, Norma Street, and Ridgecrest Boulevard. (City of Ridgecrest General Plan at page I-3.) The General Plan limits the residential categories of medium density (up to 25 units per gross acre), low density (6,000 square feet to 5 acres per parcel), and recreational uses to the urban areas of the community. The less intensive uses such as open space and rural residential (minimum parcel size of 5 acres gross) make up the fringe areas west, south and east of the community. (Id. at page 1-5.)

The Conservation Element of the City's General Plan includes policies relative to habitat and wildlife that call for promoting the survival of native wildlife species and the preservation of their natural habitat; prohibiting off-highway vehicle use in designated habitat preservation areas; and supporting the concept of the Cerro Coso Community College's (CCCC) Natural Area as designated by BLM and CCCC. (City of Ridgecrest General Plan at page 5-5.) The plan also encourages the retention of natural desert flora to control soil erosion; supports education as a means to reduce impacts to natural resources; and encourages participation in BLM planning for public lands near the city (Id. at pages 5 through 12).

3.1.3.13 City of Twentynine Palms

The City is located in central San Bernardino County, in the Morongo Basin portion of the Mojave Desert. Twentynine Palms Highway bisects the community (east-west), and most of the commercial areas are along this highway and Adobe Road, which runs in a north-south direction. Multi-family (up to 8 dwelling units per acre) and higher density single-family development (at 4 dwelling units per acre) generally surrounds the downtown commercial area, with less dense development in the outlying portions of the City. (City of Twentynine Palms General Land Use Plan at Section IV.) The stated purpose of the City's Land Use Plan "...is to provide efficiency in land use, ensure development of quality neighborhoods with housing opportunities for all citizens, enhance the business district, provide a "tourist friendly" settng, and afford an opportunity for industrial development, while protecting natural resources and preserving the quality desert lifestyle." (Id. at Section II.) General Plan policies support infill development with limited densities in the outlying areas of the city. (City of Twentynine Palms General Plan – Conservation Plan, Program 1.2.1.)

The City's Conservation Plan identifies the primary purpose of the Conservation Plan to commit "...the City to a responsible plan of action in carrying out its role in environmental protection." (Id. Section XII B.) Program 1.1.3 in the Conservation Plan requires protection of the unique habitat in the Oasis of Mara. Goal 6 of the Conservation Plan calls for the preservation of the biological resources of the Mesquite Dunes, including the Mesquite Dunes Bosque and Playa Lakebed. The plan provides programs requiring specific review of projects occurring in the Mesquite Dunes, including limitations on grading, restrictions on sand extraction and removal of Honey Mesquite trees, and a requirement for a detailed clearance survey for desert tortoise.

3.1.3.14 City of Victorville

The City of Victorville is located along Interstate 15 in the Victor Valley region of San Bernardino County, at the southern end of the Mojave Desert. The City General Plan establishes thirteen planning areas for purposes of land use designation and analysis. City land use goals include maintaining a balanced community with a diversified economic base, providing adequate city services and maintaining an aesthetically pleasing community. (City of Victorville General Plan Land Use Element at pages 51 through 54.) Residential land use designations allow for development densities ranging from one dwelling unit per five acres (Open Space and Rural Residential) to twenty dwelling units per acre (Very High Density Residential). Development densities for industrial and commercial uses range from 40 to 60% site coverage.

Resource management goals identified within the General Plan indicate that the City would monitor new information regarding the status of sensitive floral and faunal species to revise its biotic inventory; would continue to require preservation of native Joshua tree woodlands and specimens where possible; would continue to require preservation of the Mojave River riparian habitat; would continue to participate in a cooperative effort with other agencies to monitor and review the management of resources; and would continue to cooperate and consult with federal, state, county and local agencies in resolving regional resource management issues. (City of Victorville General Plan – Resource Element at pages 48 through 52.) The City has designated areas along the Mojave River as Open Space. The General Plan indicates that the City requires that a survey be conducted by a qualified biologist to determine whether tortoise habitat exists prior to issuance of grading permits for undisturbed sites. (Id. at page 44.) The plan further indicates that the City has established a "no survey" area within the City based on the results of 370 completed biological surveys. This "no survey" area was established after consultation with the USFWS.

Rockview Nature Park: A small but important educational facility operated by the City of Victorville is located at the Lower Narrows of the Mojave River. School classes are hosted for educational programs, and the site protects rocky outcrops, Joshua tree woodland, and a portion of the Mojave River riparian habitat. Trails are present providing access to the river.

3.1.3.15 Town of Yucca Valley

The Town of Yucca Valley is located in the south central portion of San Bernardino County, in the Morongo Basin. Existing development in the town is focused along State Highway 62. Nearly all of the commercial development in the town is focused along this corridor, with residential development occurring to the north and south at progressively lower densities. Development in the area is constrained by the topography, and only about 25% of the lands in the town were developed as of 1995. [Yucca Valley Comprehensive General Plan, Draft Environmental Impact Report at page II-1]. Residential densities under the General Plan range from densities of one dwelling unit per 20 acres to 14 dwelling units per acre [Id. at I-9]. Other land use designations (Commercial, Industrial) limit development at varying levels of intensity [Id. at I-13]. A total of 511 acres are zoned Open Space for park lands, lands that pose a human hazard and biologically sensitive areas [Id. at I-9].

It is a goal of the town's general plan to "... protect and preserve the Town's biological resources, especially those sensitive rare, threatened or endangered species of wildlife and their habitats. Policies of the General Plan include specific steps to preserve the long-term viability of sensitive habitat and species." [Id. at III-74.] The General Plan further requires that development in areas with sensitive species and habitat be at a compatible intensity, and addresses the need for protection of Covington Wash as a wildlife corridor. [Id. at III-74 and 75.]

3.1.4 Federal Endangered Species Act

3.1.4.1 Background

The federal Endangered Species Act of 1973 (FESA) is intended "to provide a means whereby the ecosystems upon which Endangered species and Threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species..." (FESA Section 2(b).) FESA requires that all federal agencies "seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this chapter." (Section 2(c)(1).) FESA assigns to the Secretary of the Interior the responsibility to maintain a list of threatened and endangered species and to designate critical habitat for these species (Section 4).

It is unlawful for any person to "take" a federally listed fish or wildlife species. (Section 9(a)(1)(B).) "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. (Section 3(18).) Take includes significant habitat modification or degradation that actually kills or injures wildlife (*Babbitt v. Sweet Home Chapter*, 515 U.S. 687).

3.1.4.2 Listed Species

Species listed as threatened or endangered by USFWS and found within the western Mojave Desert are identified in Table 3-3.

Table 3-3
Species Listed by USFWS as Threatened or Endangered

SPECIES	STATUS	DATE LISTED
Arroyo toad (*Bufo californicus*)	Endangered	January 17, 1995
Bald eagle (*Haliaeetus leucocephalus*)	Endangered Threatened	March 11, 1967 August 11, 1995
California red-legged frog (*Rana aurora draytonii*)	Threatened	May 20, 1996
Cushenbury milkvetch (*Astragalus albens*)	Endangered	August 24, 1994
Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*)	Endangered	August 24, 1994
Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*)	Endangered	August 24, 1994
Desert tortoise (*Gopherus agassizii*)	Threatened	April 2, 1990
Inyo California towhee (*Pipilo crissalis eremophilus*)	Threatened	August 3, 1987
Lane Mountain milkvetch (*Astragalus jaegerianus*)	Endangered	October 6, 1998
Least Bell's vireo (*Vireo bellii pusillus*)	Endangered	May 2, 1986
Mojave tui chub (*Gila bicolor mohavensis*)	Endangered	October 13, 1970
Parish's daisy (*Erigeron parishii*)	Threatened	August 24, 1994
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Endangered	March 29, 1995

3.1.4.3 Recovery Plans

USFWS has completed recovery plans for six of these federally listed species. The most important recommendations of these recovery plans are summarized below.

- *Bald Eagle* (August 25, 1986). Recovery of the bald eagle was addressed on a regional basis and the Pacific Bald Eagle Recovery Plan presented criteria for downlisting to threatened status, which were achieved in 1994. No recovery objectives or standards are applicable to the West Mojave, though the plan addresses the wintering population in the San Bernardino Mountains. Many of the eagles wintering at Lake Silverwood, Lake Arrowhead, and Big Bear Lake utilize a night roost at Las Flores Ranch, which is within the West Mojave planning area. This property is included in the Summit Valley HCP, a multispecies plan that is being prepared by the City of Hesperia. In 1999, the USFWS proposed delisting of the bald eagle because the national and regional goals for recovery were met (USFWS 1999). A decision is pending.

- *Desert tortoise* (June 28, 1994): Recovery of the desert tortoise to a point where it can be delisted depends on actions within specified recovery units, which are considered separately. The recommended conservation measures are based on establishment of DWMAs within each recovery unit, including the West Mojave Recovery Unit. Conservation actions to reduce impacts to tortoises from grazing, off-highway vehicle use, ravens, and incompatible land uses are recommended for each DWMA. In addition, a program of monitoring and environmental education is suggested.

- *Inyo California Towhee* (April 10, 1998): Recovery and delisting of the Inyo California towhee can be achieved with protection, management and enhancement of occupied riparian habitat in the Argus Mountains. Habitat enhancement includes the removal of invasive vegetation, removal of wild burros and limitations on off-highway vehicle access. The Recovery Plan also calls for monitoring of the habitat and towhee populations and development of a public outreach program.

- *Mojave tui chub* (September 17, 1984): The Mojave tui chub can be downlisted to threatened status after establishment of three additional self-sustaining populations. For delisting, re-introduction and establishment of viable populations into a majority of the historic habitat in the Mojave River is necessary. This fish is currently maintained at small refugia at China Lake NAWS, Zyzzyx, and Camp Cady.

- *Southwestern Arroyo Toad* (July 24, 1999): Protection of 20 occupied drainages and adjacent upland habitat in northern, southern and desert slope recovery units is necessary for the arroyo toad to be downlisted to threatened. Protection of an additional 15 populations in these recovery units is necessary for delisting. A portion of the desert slope recovery unit is within the West Mojave planning area, and includes Little Rock Creek in Los Angeles County and Deep Creek, Little Horsethief Creek and the Mojave River in San Bernardino County. Most occurrences of the arroyo toad are within the San Bernardino and Angeles National Forests, with a small extension of occupied habitat extending onto private and BLM lands in the western Mojave Desert.

- *Southwestern willow flycatcher* (August 30, 2002): Delisting of the southwestern willow flycatcher would require population increases and stabilization at specified river reaches within six Recovery Units. The Basin and Mojave Recovery Unit is found within the West Mojave Plan area, and contains two focus areas for management attention and conservation efforts: 1) the West Fork of the Mojave River from its headwaters to Mojave Forks dam (Hesperia area) and 2) the Mojave River between Spring Valley Lake and Bryman (Victorville-Apple Valley and San Bernardino County). The population size within these units must increase from the current level of 13 territories to 25 territories. Recommended habitat enhancement measures include removal of invasive riparian plants, such as Russian olive and saltcedar and trapping of brown-headed cowbirds, which parasitize flycatcher nests.

- *California Red-legged Frog* (May 28, 2002): Delisting can be considered after five criteria are met. The first is protection of 35 core areas. Within the West Mojave are two core areas: the San Gabriel Mountains and the Forks of the Mojave River. The San Andreas Rift Zone at the southwest edge of the planning area contains occupied habitat for this species, and the upper Mojave River contains suitable (and historical) habitat where the frog could be re-established. The remaining criteria are stability of the populations, sufficient geographical distribution, successful establishment in historical habitat and needed research completed.

Recovery Plans for other species (Least Bell's vireo, carbonate endemic plants) have been published in draft format and are awaiting public comment and finalization by USFWS.

3.1.4.4 Critical Habitat

Critical habitat has been designated for the desert tortoise and Inyo California towhee. Critical habitat designations for the least Bell's vireo and southwestern willow flycatcher do not extend into the West Mojave planning area. Designations for the arroyo toad and red-legged frog have been vacated by recent judicial decisions. On October 30, 2002, the United States District Court for the District of Columbia set aside the critical habitat designation for the arroyo toad and ordered the Service to publish a new final rule by July 30, 2004 (*Building Industry Legal Defense Foundation, et al., v. Gale Norton, Secretary of the Interior, et al., and Center for Biological Diversity, Inc. and Defenders of Wildlife, Inc.* Civil Action No. 01-2311 (JDB) (U.S. District Court, District of Columbia)). A similar ruling in a different case was made for the red-legged frog. A discussion of each of these designations follows.

- *Carbonate endemic plants:* Critical habitat for four of the five listed carbonate endemic plant species was designated in the West Mojave on December 14, 2002. Several distinct areas on the north slope of the San Bernardino Mountains near Lucerne Valley were designated to include known occupied habitat for Cushenbury milkvetch, Cushenbury buckwheat, Cushenbury oxytheca and Parish's daisy. A total of 1,585 acres of BLM land comprise the critical habitat, along with a smaller acreage of private land. [Designated December 2002, *Federal Register* 67(247):78570-78610.]

- *Desert Tortoise:* Critical habitat for the desert tortoise occupies substantial portions of the central and southeastern West Mojave planning area (USFWS 1994a). The designation includes parts of three military bases and covers much of three of the four participating counties, with an extension into Riverside County within Joshua Tree National Park. [Designated February 1994, *Federal Register* 59(26):5820-5866.]

- *Inyo California Towhee:* Critical habitat for the Inyo California towhee lies entirely within Inyo County and surrounds springs and seeps occupied by this endangered bird. The majority of critical habitat is located on the China Lake NAWS. [Designated 1987, *Federal Register* 52:28780-28788.]

3.1.4.5 Exceptions to FESA's Take Prohibition

Take may be allowed in certain cases where it is incidental to the carrying out of an otherwise lawful activity. These cases include: (1) FESA Section 7 consultation procedures, for projects authorized, funded or carried out by a federal agency ("federal actions"); and (2) issuance by USFWS of an incidental take permit, for non-federal actions. Each is discussed below.

Incidental Take Permits: The USFWS may authorize, by permit, takings of an animal listed by USFWS as threatened or endangered, which are incidental to, and not the purpose of,

the carrying out of an otherwise lawful activity that is not a federal action. (FESA Section 10(a)(1)(B).) These "Section 10(a)" permits may be issued if an applicant for a permit submits to USFWS a "conservation plan" that satisfies the following permit issuance criteria:

> (i) The taking will be incidental;
> (ii) The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
> (iii) The applicant will ensure that adequate funding for the plan will be provided;
> (iv) The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and,
> (v) The measures, if any, required under [1539(a)(2)(A), "such other measures that the Secretary may require as being necessary or appropriate"] will be met, and [the Secretary] has received such other assurances as he may require that the plan will be implemented.... [Id. At Section 10(a)(2)(B).]

These criteria do not explicitly require that a conservation plan (also known as a habitat conservation plan, or HCP) contribute to the recovery of a listed animal species. Rather, an HCP need only ensure that the "likelihood of the survival and recovery of the species in the wild" will not be appreciably reduced.

Listed plants on private lands are treated somewhat differently. Section 10(a) permits and "no surprises" assurances cannot be issued for listed plants. Permit issuance procedures do, however, provide indirect protection for plants. This is because an HCP's conservation program may not jeopardize the continued existence of any listed species, including plants. If this could occur, the permit would not be issued.

The Section 10(a) permit applies to the federal Endangered Species Act only. A comparable permit (the "Section 2081 permit") applies to the California Endangered Species Act, and is issued by CDFG for species listed as threatened or endangered by the State of California (see discussion below, at Section 3.1.5.3 of this document).

The Section 10(a)(1)(B) incidental take permit should not be confused with the separate Section 10(a)(1)(A) permit, which is issued to scientists working with threatened or endangered species on federally-authorized research projects where take of the species is *intentional*.

Nine habitat conservation plans have been approved for lands within the planning area. These include the following:

- Cushenbury Sand and Gravel
- Hi Desert Power Project
- Miller Church Site
- Sunland Communities
- Wildwash Sand and Gravel Site
- Sunwest Homes
- Kern County Waste Management (Boron, Ridgecrest, and Mojave/Rosamond Sanitary Landfills)
- Department of Corrections Electrified Fence Project (California City State Prison)
- U. S. Borax 1940 Acre Expansion

Section 7 Consultations: A different procedure governs projects and activities that are "authorized, funded or carried out" by the federal government, including those located on public lands under BLM, National Park Service or Department of Defense jurisdiction. FESA requires that federal agencies shall, "in consultation with and with the assistance of [USFWS] insure that any [such] action ... is not likely to jeopardize the continued existence of any Endangered species or Threatened species or result in the destruction or adverse modification of [critical] habitat of such species..." (FESA Section 7(a)(2).) The term "jeopardize" means to "engage in an action that would reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species." (50 Code of Federal Regulations (CFR) Section 402.02.)

Accordingly, a federal lead agency "consults" with the USFWS if it determines that a project "may affect" a threatened or endangered species. Consultation is initiated when the federal lead agency submits a biological assessment or similar document to the USFWS that describes the project, its anticipated impacts, and proposed mitigation. USFWS evaluates the information provided and determines if the effect can be avoided or if the effects are wholly positive. If so, only "informal consultation" will be carried out and the USFWS issues written concurrence that the project is not likely to adversely affect listed species or designated critical habitat. If an adverse effect cannot be avoided, "formal consultation" is required, and the USFWS issues a biological opinion that states whether the proposed project will jeopardize the continued existence of the species or will destroy or adversely modify critical habitat. If jeopardy is found, USFWS must suggest "reasonable and prudent alternatives" that could be implemented to prevent the species' existence from being jeopardized or critical habitat being destroyed. A "no jeopardy" opinion will provide "reasonable and prudent measures" to ensure that take is minimized. "Terms and conditions" are issued to provide specific guidance for implementing the reasonable and prudent measures. Because of this, no terms and conditions can be issued for listed plant species. Only non-binding conservation recommendations can be issued for plants.

If critical habitat is designated after issuance of a no jeopardy opinion, the federal agency is required to re-initiate consultation to obtain a determination of "no adverse modification" to the critical habitat. Because of the frequent time lag between species listing and critical habitat designation, several projects have been required to re-initiate consultations under Section 7 of the ESA.

Consultations Conducted Within the Planning Area: A total of 234 biological opinions authorizing 263 California and Nevada projects having the potential to affect tortoises were issued between 1990 and 1995. Of the 133 biological opinions issued in California, 101 led to ground disturbance when projects were developed, resulting in the loss of 53 tortoises (LaRue and Dougherty 1998)[2]. For these projects, terms and conditions were implemented that resulted in 919 tortoises being moved from harm's way at the time of construction (Circle Mountain Biological Consultants 1996, LaRue and Dougherty 1998). Because no comprehensive analysis has been completed for federal biological opinions since 1995, the following discussion is

2 During the same time, only four Section 10(a) permits were issued. Nine Section 10(a) permits have been issued to date for tortoises in California (Bransfield, pers. comm.).

restricted to these 1990 - 1995 projects. Table 3-4 shows the project types, number of tortoises handled, and number accidentally killed during construction of the 101 projects.

Table 3-4
Numbers Of Tortoises Handled And Accidentally Killed During Construction Of 101 Federally Authorized Projects In California Between 1990 And 1995

PROJECT TYPE	PROJECTS	TORTOISES HANDLED	DEAD TORTOISES
Pipeline	19	583	38
Transmission Line	15	227	7
Military	7	14	5
Mining	19	59	2
Highway	19	19	1
Tract/Parcel	13	13	0
Programmatic	13	5	0
Miscellaneous	2	2	0
Landfill	2	0	0
Hazardous Materials	1	0	0
Total	**101**	**919**	**53**

This summary shows that long, linear projects (transmission lines and pipelines) were responsible for most of the harassment and mortality take of tortoises in California. Although these two project types comprised only a third of the authorized projects (34 of 101 projects), they were responsible for 88% of the harassment take (810 of 919 tortoises handled) and 85% of the mortality take (45 of 53 tortoises accidentally killed). The study also identified the federal lead agencies associated with these 101 projects, as summarized in Appendix L.

BLM Consultation Procedures: Actions undertaken by, or permitted by, the BLM are federal actions that may require informal or formal consultation under Section 7 with the USFWS. BLM's consultation procedures are described below, using a crude oil pipeline proposal as an example.

A project proponent wishing to install a pipeline across public lands is required to obtain a right-of-way grant from the BLM. The proponent may also be required to obtain additional permits and authorizations from other federal agencies (e.g. Corps of Engineers). The federal agencies jointly identify a federal lead agency, usually the entity with the highest level of involvement. In the case of a crude oil pipeline crossing significant miles of public lands, BLM is likely to be identified as the federal lead agency. This can be the case even if the project proponent is a private entity and some or most of the lands crossed are private lands.

Both take authorization and compensation are based on the entire alignment, regardless of land ownership. In the case of the 70-mile Morongo Basin water pipeline, constructed between Hesperia and Landers in the mid-1990s, the biological opinion applied to the entire project although the alignment crossed fewer than five linear miles of BLM land. Tortoises were authorized to be moved out of harm's way, the proponent was obligated to revegetate all non-access areas within the right-of-way, and compensation was based on the width of the newly impacted area multiplied by the 70-mile length, which included private lands.

Based on presence-absence survey results and other available information submitted by the proponent, the BLM determines if the project may affect a listed species. If BLM determines that a project will not affect a listed species it does not have to consult, either formally or informally with the USFWS. BLM *may* ask the USFWS to concur in its no-effect determination, but it is not required to. If BLM makes a "may affect" determination, formal consultation will be required. The USFWS has 45 days to review materials provided by the BLM and project proponent, 90 days to draft a biological opinion, and an additional 45 days to deliver it. The biological opinion outlines reasonable and prudent measures and terms and conditions to minimize take of listed fish and wildlife on-site and compensate through land acquisition, habitat rehabilitation, and other measures off-site.

Minimization measures have proven effective to alleviate impacts at the time of construction (LaRue and Dougherty 1998). Clearance surveys are standard parts of take avoidance measures. The proponent is obligated to delineate the work zone and restrict all impacts to that area, maintain a litter-free environment to minimize the attraction of tortoise predators (feral dogs, coyotes, ravens, etc.), and keep vehicle speeds below a certain level. Construction personnel are given awareness programs to avoid crushing tortoises or their burrows.

In addition to take avoidance measures to be implemented on-site, protecting or enhancing habitats off-site is often required to compensate impacts. Between 1990 and 1995, land acquisition was required by 44% percent of the biological opinions issued in California (LaRue and Dougherty 1998). For BLM projects, the proponent typically pays a compensation fee to offset the impact to tortoises ($700/acre), and may also be required to pay endowment funds to the CDFG ($230/acre), although this latter cost has not been consistently applied to every federal project. Alternatively, the proponent may purchase and deed to the BLM or CDFG compensation lands that meet with the approval of the BLM, and occasionally the CDFG. In such cases, field staff completes a Proposed Lands For Acquisition Form (PLFAF).

A compensation ratio, developed for the interagency desert tortoise management oversight group (MOG) in 1991, uses seven variables to determine a multiplying factor that is applied to the acreage lost to development (Desert Tortoise Compensation Team 1991). The range of compensation rates for various BLM habitat categories is given as follows (Desert Tortoise Compensation Team 1991): Category I = 3 to 6, Category II = 2 to 5, and Category III = 1 (the standard in all areas). This means that the compensation ratio may be as high as 6:1, indicating that six acres of conservation habitat would be purchased for each acre of impact. For example, 40 acres of impact would be compensated by acquiring 240 acres of conservation land, or alternatively, paying $168,000 to BLM (240 acres at $700/acre).

3.1.5 California Endangered Species Act

3.1.5.1 Background

CESA (Cal. Fish and Game Code 2050 et seq) is administered by the CDFG as the trustee for fish and wildlife resources in the State of California. CESA authorizes the California Fish and Game Commission to establish a list of endangered and threatened species, and states that "no person shall...take...any species...that the commission determines to be an endangered species or a threatened species ... except as otherwise provided in this chapter, the Native Plant Protection Act ... or the Calfiornia Desert Native Plants Act." (Section 2080.) The State may designate plant species as rare, pursuant to the California Native Plant Protection Act, which has the same protection status as threatened or endangered species. That Act, however, allows those undertaking activities described in Section 1913, subdivision (a) and (b), to change the land use when they have been notified a rare or endangered plant is present as long as they give 10 days notice to CDFG to allow for salvaging the plant.

3.1.5.2 Listed Species

Species listed as threatened or endangered by CDFG are identified in Table 3-5.

Table 3-5
Species Listed by CDFG as Threatened or Endangered

SPECIES	STATUS	DATE LISTED
Bald eagle (*Haliaeetus leucocephalus*)	Endangered Endangered (Rev.)	June 27, 1971 October 2, 1980
Desert tortoise (*Gopherus agassizii*)	Threatened	August 3, 1989
Inyo California towhee (*Pipilo crissalis eremophilus*)	Endangered	October 2, 1980
Least Bell's vireo (*Vireo bellii pusillus*)	Endangered	October 2, 1980
Mohave ground squirrel (*Spermophilus mohavensis*)	Threatened	June 27, 1971
Mojave tarplant (*Hemizonia [= Deinandra] mohavensis*)	Endangered	August 1981
Mojave tui chub (*Gila bicolor mohavensis*)	Endangered	June 27, 1971
Red rock tarplant (*Hemizonia Deinandra] arida*)	Rare	July 1982
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Endangered	January 2, 1991
Swainson's hawk (*Buteo swainsoni*)	Threatened	April 17, 1983
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	Threatened Endangered	June 27, 1971 March 26, 1988

3.1.5.3 Incidental Take Permit

Section 2081(b) of CESA authorizes the CDFG to allow, by permit, the take of an endangered, threatened or candidate species. Such a "Section 2081 permit" may be issued only if the following permit issuance criteria are met:

(1) The take is *incidental to an otherwise lawful activity.*

(2) The impacts of the authorized take shall be *minimized and fully mitigated.* The measures

required to meet this obligation shall be *roughly proportional* in extent to the impact of the authorized taking on the species. Where various measures are available to meet this obligation, the measures required shall *maintain the applicant's objectives to the greatest extent practicable.* All required measures shall be capable of successful implementation. For purposes of this section only, impacts of taking include all impacts on the species that result from any act that would cause the proposed taking.
(3) The permit is consistent with any regulations adopted pursuant to Sections 2112 and 2114.
(4) The applicant shall ensure *adequate funding* to implement the measures required by paragraph (2), and for monitoring compliance with, and effectiveness of, those measures. [CESA Section 2081(b), emphasis added.]

CESA further requires that no incidental take permit may be issued if issuance of the permit would jeopardize the continued existence of the species, a determination that CDFG must make based on the best scientific and other information that is reasonably available. This must include consideration of the species' capability to survive and reproduce in light of known population trends, known threats to the species, and reasonably foreseeable impacts on the species from other related projects and activities.

The Section 2081 permit applies only to CESA. It does not excuse an applicant from obtaining a FESA Section 10(a) permit, issued by USFWS for species listed as threatened or endangered by the United States (see Section 3.1.4.5, above).

3.1.6 Acquiring Incidental Take Permits: Procedures and Costs

Several steps are currently necessary to determine whether Section 10(a) and Section 2081 incidental take permits are needed. This section reviews those procedures, and the costs associated with them. The permit procedures for the desert tortoise are used as a representative example of how the process works.

Overview: The project proponent's first step is to perform a tortoise "presence-absence" survey. This is usually done with the assistance of a trained consultant. If no tortoises are found, the developer can proceed with development. If tortoise sign is found, the developer must first obtain Section 10(a) and Section 2081 permits. The USFWS's regulations do not specify a time frame for issuing Section 10(a) permits, so a permit may take a year or more to process and issue. Section 2081 permits may require between six months and a year to obtain. A permit typically will require the permittee to: (1) mitigate with land purchase, (2) employ an authorized biologist to conduct a "clearance survey" and to monitor construction, and (3) provide endowment funds to CDFG.

Presence and Absence Survey Costs: Tortoise surveys are performed at about 4 acres/hour, for between $35 and $125 per hour, so that a presence-absence survey on 40 acres would cost between $350 and $1,250, depending on the consultant. When costs are included for travel, mileage, per diem, report writing and overhead, the final report for that 40-acre site may run between $500 and $5,000. If no tortoise sign is found, there are rarely other costs relative to threatened and endangered species, although Streambed Alteration Agreements, mitigation to avoid nesting birds and native plant salvage are occasionally separate permitting issues. If tortoise sign is found, the proponent must secure State and federal incidental take permits.

Obtaining an Incidental Take Permit: Information on the nine Section 10(a) permits issued for the desert tortoise in the planning area is available. These include the following projects: (1) California City Prison, (2) Cushenbury Sand and Gravel Mine, (3) High Desert Power Project, (4) Kern County Waste Management Project, (5) Miller Church Sites, (6) Statewide Electrified Fence Project, (7) Sunland Communities, (8) U.S. Borax Mine Expansion, and (9) Wildwash Sand & Gravel Mine. The Table 3-6 summarizes some of the pertinent aspects of eight of these projects; no information was available for the electrified fence project. Appendix G identifies the sources of the information displayed in this table.

Table 3-6
Section 10(a) Permits Previously Issued In Planning Area
As Of November 2002

PROJECT NAME	ACRES & LOCATION	DATE AND TIME FOR ISSUANCE	REPORT COSTS	COMPENSATION RATIO & COST	TORTOISES "TAKEN"
California City Prison	70 acres, Calif.City	1997, 6 to 9 months	Unknown	1:1 @ $1,600,000	None taken between 1998 and 1999, when completed
Cushenbury Sand and Gravel	115 acres, S Lucerne Valley	1993-4, 3-4 years	$7,500	1:1 @ $103,500 - $115,000	None; only +/- 15 acres developed, but habitat marginal, few expected
High Desert Power Project	175 acres, N Adelanto	1999, 3 years	$70,000	1:1, $900,000	None; tortoises were handled on the Section 7 portion of this project, but not on the 10a portion
Kern County Waste Management	40 acres Rosamond 20 acres Boron 121 acres Ridgecrest	1997, 5 years	Unknown	3:1, Unknown Cost	None; no tortoises have been handled or accidentally killed
Miller Church Sites	5 acres, Yucca Valley	1993, 18 months	$3,500	1:1 @ $9,000	None; only tortoise scat found at construction
Sunland Communities	160 acres, Victorville	1994, 3 years	$7,500	2:1 @ $220,000	None; project not developed as of 2002
U.S. Borax Mine Expansion	1,940 acres, Boron	1996, +/- 2 years	$250,000 including other docs	1:1 @ $969,900	None; 10 authorized, but none taken as of 2002
Wildwash Gravel Pit	35 acres, N of Victorville	1995, 11 months	$6,200	1:1 @ Unknown cost	None; only tortoise scat found at construction
Total: 8 Projects	2,647 acres	6 months – 5 years avg = 3 years	$3,500-$250,000	1:1 up to 3:1	No tortoise handled or accidentally killed on any project

Compensation Cost, in the 5th column, includes both land acquisition costs and endowment funds that were reported by the main information sources for each project

To obtain a Section 10(a) permit, the project proponent must submit a permit application, habitat conservation plan, environmental assessment or impact statement, and implementation agreement to the USFWS. The CDFG's Section 2081 permit application is very similar including sections identifying the applicant, listing species to be covered, project description and location, listed species to be taken, impact analysis, jeopardy analysis, mitigation and minimization measures, monitoring and reporting program, funding, and certification. A

consultant is generally enlisted to draft these documents, which may cost from several thousand dollars to hundreds of thousands of dollars, depending on the complexity of the project. Costs of most small and larger projects range from $5,000 to $65,000.

Drafting the HCP and supporting documents is a small percentage of the cost; mitigation and compensation are the major expenses. For example, it cost about $3,500 in 1993 to draft the HCP and associated documents for a five-acre church site in Yucca Valley (Tierra Madre Consultants, Inc. 1993) and $6,200 in 1995 for the documents associated with a 35-acre gravel mine site north of Victorville (Circle Mountain Biological Consultants 1995). U.S. Borax indicated that the Section 10(a) permit issued around 1996 for expansion of the U.S. Borax mine site at Boron allowed for expansion into 1,940 acres of marginal tortoise habitat. The approximate cost to draft the environmental documents, including documents relative to their Conditional Use Permit and SMARA requirements, was about $250,000.

Months or even years may pass between submittal of a permit application and issuance of the permit. For example, it took 18 months for the 1993 Section 10(a) permit to be issued for a five-acre impact by two church sites (Tierra Madre Consultants, Inc. 1993) and three years for the 1994 Sunland Communities Section 10(a) permit to be issued (Tierra Madre Consultants, Inc. 1994). By the time this latter permit was issued, there was no market for this proposed tract home development; despite the expenditure of $220,000 in mitigation funds, this residential project remains undeveloped as of 2002. Given backlogs, current workloads, and limited USFWS staffing, a one to two-year waiting period is likely for issuance of a new Section 10(a) permit. CDFG may issue a Section 2081 permit in six months to a year.

Clearance Survey: Section 10(a) and Section 2081 permits invariably require clearance surveys, where tortoises are moved out of harm's way immediately prior to mechanical vegetation removal. It takes a biologist about twice as long to clear the site of tortoises as to conduct a presence-absence survey. Thus the cost of a clearance survey is about $1,000 to $10,000 (compared to $500 to $5,000).

Mitigation/Compensation: Incidental take permits invariably have a land compensation component. Depending on the location of the land and size of the parcel, compensation land may cost between $500 and $1,300/acre, although the prison constructed in the northeastern portion of California City cost $5,000/acre (J. Stewart, pers. comm.) In addition, CDFG typically requires an endowment. Most Section 10(a) permits have been compensated at 1:1, although Kern County Waste Management reported a compensation ratio of 3:1 for three landfills. Sunland Communities purchased 320 acres of compensation land to partially offset the impacts to tortoises on the 160-acre parcel that was to be developed. The total mitigation cost was $220,000 for the 160-acre site, or about $1,375/acre (excluding document preparation or monitoring costs). The mitigation cost for California's first tortoise Section 10(a) permit was $9,000 for 5 acres, or about $1,800/acre (Tierra Madre Consultants, Inc. 1993). Dave Weiss (pers. comm. Nov 2002) indicated that U.S. Borax was required to compensate at a 1:1 ratio, replacing 1,940 acres of marginal habitat with more suitable, manageable habitats. Dennis Boyle, also of U.S. Borax, indicated that the compensation costs were $969,900, or about $500/acre. This cost did not include on-site compliance, biological monitoring, and other associated costs.

Monitoring: Monitoring is often the most expensive of all environmental protection costs. Depending on the project, an authorized biologist may remain on site for an hour, as a small parcel is brushed, or up to months and years, as an interstate pipeline is installed or a highway widened. Revegetation costs may also be very high, requiring the purchase of native seeds and the labor of contractors to broadcast and imprint the seed and to salvage cactus and yuccas. At present (2002), most monitoring costs are about $35 to $50/hour. Monitoring costs, then, may run from several hundred dollars for a day, up to $1,400 to $2,000 per week, $5,600 to $8,000 per month and, for long-term monitoring, $291,200 to $416,000 annually.

Consultation and Incidental Take Permit Processes Compared: The comparisons given above for eight Section 10(a) permits indicates that tortoises were neither handled (harassment take) nor accidentally killed (mortality take) during construction and operation on the sites. Given the delay between the presence-absence tortoise survey and permit issuance, which was found to be about three years, it is likely that tortoises were extirpated in the interim. Alternatively, tortoises still occur in adjacent areas but were not directly affected by the project. As such, under current management compensation fees ranging from $500 to $5000/acre have served to compensate lost habitat where tortoises have not been directly affected, and has done little to minimize the indirect impacts that are likely to affect the tortoises in adjacent areas.

Most of the existing development outside city limits occurs on private lands, where there have been only nine Section 10(a) permits issued in California in the past 12 years. For example, of the 47,538 structures digitized from 1995 aerials, 46,150 (97%) were found on private lands. Most of this land occurs within the known historic range of the tortoise, and much of it (i.e., 3,079,403 acres (4,812 mi^2) of Survey Areas on public and private lands outside DWMAs) is expected to continue to support tortoises. In fact, of 78 tortoise surveys performed in urbanizing areas, LaRue reported finding tortoise sign on 25 sites, or about a third (32%) of those surveyed. For comparison, only 1,388 of the 47,538 structures (3%) in 1995 occurred on public lands administered by the BLM, where there had been 50 biological opinions issued between 1990 and 1995.

In addition to BLM's 50 biological opinions, 42 were issued to the Department of Defense, NASA, and U.S. Army Corps of Engineers (Circle Mountain Biological Consultants 1996, LaRue and Dougherty 1998). During the same period, only three or four Section 10(a) permits were issued for private development. Relative private and public land acreage cannot explain this disparity between Section 7 and Section 10(a) authorizations. The disparity appears to be due to several other factors (see also discussion in LaRue 1994):

- Many private land developers have opted to abandon projects when faced with mitigation costs and permitting delays. Examples include the 160-acre Carl Jones site in Apple Valley, and the 52-mile long Copper Mountain Mesa pipeline, which was originally intended to be 102 miles long (LaRue, pers. comm.). The costs of permitting under Section 7 are invariably less because a consultant is not needed to draft the HCP, environmental assessment or impact statement, implementing agreement and other associated documents. In addition, Section 7 implementing regulations require the issuance of the biological opinion in 135 days, while no such time limit exists for processing a Section 10(a) permit.

- Because the Section 7 is cheaper and faster, project proponents select that alternative whenever federal lands, even a very small proportion of project lands, or other regulatory oversight is involved. This results in projects that cover large acreages of private lands and small to moderate amounts of federal lands being addressed under Section 7 procedures.

- The federal standard of "may affect" has a lower threshold for authorization than the standards for a private Section 10(a) permit. For Section 7, both direct and indirect impacts "may affect" tortoises, whereas authorization under Section 10(a) is required only if actual take will result.

- When construction or land disturbance on private land involves only ministerial permits, or is not subject to the jurisdiction's permitting authority (e.g.. agriculture), it is typically left to the project proponent and the USFWS to determine whether take will occur. Such projects, however, are individually minor enough that the wildlife agencies seldom become involved and the project proponent does not normally conduct biota surveys. The high costs involved with the Section 10(a) permitting process may contribute to the reluctance of local jurisdictions to incorporate additional oversight of ministerial projects into their zoning ordinances relative to biological resources.

Many of the differences between Section 7 and Section 10(a) permitting have been described and compared in LaRue (1994). In general, relative to Section 10(a), Section 7 has the following advantages for project proponents: (a) it is quicker; (b) it facilitates project completion; (c) it avoids interagency conflicts; and, (d) it is less expensive. Cumulatively, each of these factors has contributed, along with those given above, to more Section 7 authorizations as compared to Section 10(a). Recommendations were made to the USFWS in 1994 to expedite the issuance of small-project Section 10(a) permits: (a) provide meaningful direction to the private development community; (b) set a time limit for Section 10(a) permit review; (c) localize the review process; (d) ensure consistency; and, (e) ensure continuity (LaRue 1994).

One problem associated with development of private lands is the inconsistent approaches among the many different jurisdictions. In one city, for example, the planning department requires tortoise surveys on single-family residential lots, which are covered by ministerial permits in other jurisdictions and therefore not subject to biota surveys. Some cities have identified areas where tortoise surveys are no longer being performed. There are several examples where the biological consultant erroneously concluded that a few tortoise scat and/or old burrows did not constitute occupied habitat. Based upon the consultant's conclusion, jurisdictions did not require applicants to obtain necessary permits and, in several cases, tortoises were later found on site. There are numerous cases where the project proponent completed a focused tortoise survey, and the jurisdiction (or regulatory agency) later required the applicant to conduct additional focused surveys for burrowing owl, LeConte's thrasher, and Mohave fringe-toed lizards.

There are significant problems associated with the current regulatory process for determining and mitigating take of the Mohave ground squirrel. Fewer than a dozen biologists are permitted by CDFG to trap the MGS, and the trapping period (generally between March and May)

is so restrictive that project delays are common. In fact, most project proponents forego trapping and assume presence, obtain Section 2081 permits, and complete appropriate mitigation and compensation (CDFG, pers. comm. 21 August 2002).

The cost of trapping studies depends on the size of the project area, and can exceed the cost to mitigate and compensate impacts. If the trapping result is negative, there is no need for issuance of a 2081 permit; if positive, the proponent would need the take permit and pay associated costs. Although this has resulted in CDFG having to issue more permits, including projects where the MGS may not occur, there have not been substantial delays, as current staff are issuing permits in a timely manner (i.e., within a few months).

3.2 AIR QUALITY, SOILS AND WATER

3.2.1 Climate and Air Quality

The climate and air quality of the western Mojave Desert is discussed briefly below. A more detailed discussion can be found in Appendix H.

3.2.1.1 Climate

The West Mojave planning area is a desert characterized by hot summer temperatures (average daily highs above 100 degrees Fahrenheit) and low annual precipitation (approximately 5 inches). Snow can occur during the winter. Probably more important than the averages is the extreme variability in the weather. Daily temperatures ranges of 40 degrees can occur. Precipitation extremes are also common: variations of 80% in annual precipitation can occur. Summer thunderstorms can drop more precipitation on a site in one event than the mean precipitation for that location. High winds can occur. Peak wind velocities above 50 miles per hour (MPH) are not uncommon and winds of 100 MPH occur every year.

Temperature: Extremes of temperature are common in the planning area. Below or near freezing temperatures are common at most weather stations. Seven of thirteen stations have average low temperatures below freezing in December and January. El Mirage has the lowest average temperatures in the planning area and Twentynine Palms has the highest average temperatures. Average daily temperature variation is 29 degrees for all stations. Seasonal variations are high. Ridgecrest, for example, has recorded highs of 118 degrees and lows of 0 degrees since the middle 1980s.

Precipitation: Deserts are noted for their low rainfall and the Mojave Desert is no exception. The blocking nature of the mountains on the western and southern boundaries of the desert results in a rain shadow on the desert side of the mountains where precipitation is far less than on the coastal side. Weather patterns and their resulting precipitation follow the seasonal wind patterns and changes. This results in winter precipitation generally arriving from the southwest and spreading eastward across the desert. Winter precipitation volumes normally are the highest in the western Mojave Desert and diminish toward the east. This is illustrated in the mean precipitation for western locations such as Lancaster and Mojave (over 6 inches) and

eastern cities such as Twentynine Palms (4 inches) (see also precipitation tables in Appendix H).

All of the weather stations in the planning area receive some of their precipitation as snow. The total average snowfall ranges from under one inch in Trona to over three inches at Haiwee reservoir and Lancaster.

A cyclic weather phenomenon called the El Nino brings increased precipitation to portions of the eastern Pacific Rim. This is especially true in the western Mojave Desert. Weather Bureau records indicate that there have been 23 El Nino years since 1931. These 23 years represent approximately 1/3 of the years, but on the western edge of the desert, those years account for 65% of the precipitation. This east to west variability is also reflected in the pronounced east to west difference in the influence of the El Nino years. In Twentynine Palms, for example, only 44% of the precipitation falls in El Nino years as opposed to 65% along the western edge of the desert.

During the summer the western edge of the Mojave Desert is heavily influenced by the dry southwest airflows resulting in typically very dry weather. The influence of the southwest winds diminishes toward the eastern Mojave Desert. This results in a more continental influence and its resulting monsoonal weather patterns. This is illustrated by comparing Randsburg (along the western edge of the planning area) with Needles (in the eastern Mojave). In Randsburg, only two percent of the Julys and six percent of Augusts have more than 1 inch of precipitation. By comparison, in Needles, more than 1 inch of monthly precipitation falls in sixteen percent of the Julys and twenty-seven percent of the Augusts. Even sites within the eastern portion of the planning area (such as Twentynine Palms) average more precipitation in July and August than they do in January and February.

The consistent occurrence of two wet seasons in the eastern portion of the planning area is reflected in the vegetation. There is a distinction between plants having most of their photosynthetic activity during the late spring and summer (warm season plants) and plants having most photosynthetic activity during the winter (cool season plants). The vegetation in the eastern Mojave Desert includes warm season plants such as Mojave yucca (*Yucca schidigrea*), galleta grass species (*Pleuraphis spp.*) and others in addition to the cool season plants. The warm season plants are absent from the western edge of the desert. The break between the warm season area and the cool season area follows a north south line along the Mojave River and just west of Harper Dry Lake. The cool season areas are the Indian Wells and Searles Valleys south through the Antelope Valley and east to near the Mojave River.

Extreme variability is another characteristic of the precipitation. Some locations such as Mojave have a mean precipitation of 6.06 inches and a standard deviation of 4.04 inches. This means that the normal precipitation ranges from a low of 2.02 inches to 10.10 inches. This is an 80 % variation in precipitation volumes.

Drought: When precipitation is below average, it is considered a drought. The Palmer Drought Severity Index (PDSI) has become the semi-official drought index. The PDSI uses precipitation and other moisture data to develop a dryness index. The index uses "0" as normal for a site and negative numbers to indicate severity of a drought and positive numbers to indicate

excess moisture. A minus 4 is considered a severe drought. The NOAA Drought Information Center has used instrument data in combination with tree ring data to construct a table of PDSI for the period of 1700 to 1995. One of the sites for which data has been collected is just east of Barstow. Using that data in combination with other PDSI data, Figure 3-2 was constructed to illustrate the long-term trend for this site. In addition a moving average was added to the chart to show the trend. From the chart it is apparent that a drought occurred from 1951 through 1979 that was the longest duration the current time and is the most severe in the last 300 years (see Appendix H).

3.2.1.2 Air Quality

Air Basins: The West Mojave planning area falls within portions of three different air basins. These are the Great Basin Valleys Air Basin (GBVAB), the Mojave Desert Air Basin (MDAB) and the Salton Sea Air Basin (SSAB) (see Map 3-2). The Great Basin Valleys Air Basin includes all of Inyo and Mono Counties. The Mojave Desert Air Basin includes the desert portions of Kern, Los Angeles, San Bernardino Counties and the Paloverde Valley portion of Riverside County. The Salton Sea Air Basin includes the Coachella Valley portion of Riverside County and Imperial County. The United States Environmental Protection Agency (USEPA) breaks these air basins into planning areas based upon various emission problem or watershed boundaries.

Air Quality Management Districts: The management/enforcement of the air quality standards falls on several different jurisdictions. The USEPA has the primary responsibilities under the Federal Clean Air Act (CAA). The USEPA had transferred a number of responsibilities to the states and in most cases, regional air quality management districts. The West Mojave planning area falls within five different regional air districts (see Map 3-3):

- The desert portions of San Bernardino County and the Palo Verde Valley portion of Eastern Riverside County are within the Mojave Desert Air Quality Management District (MDAQMD).
- Inyo and Mono Counties are within the Great Basin Unified Air Pollution Control District (GBUAPCD).
- The Antelope Valley Portion of Los Angeles County is in the Antelope Valley Air Quality Management District (AVAQMD).
- The Coachella Valley portion of Riverside County is within the South Coast Air Quality Management District (SCAQMD).
- The eastern (desert) portion of Kern County is within the Kern County Air Pollution Control District (KCAPCD).

Air Quality Overview: Much of the time, air quality in the western Mojave Desert is good. There are, however, times that localized areas have not met air quality standards due to locally generated and/or transported in pollutants. The entire planning area has been classified as non-attainment areas for PM_{10} (Map 3-4), ozone (Map 3-5), sulfates and/or hydrogen sulfide under the state and/or national standards (see Table 3-7). In addition, there is concern for visibility reducing particles and PM10 precursor emissions including oxides of nitrogen (NOx),

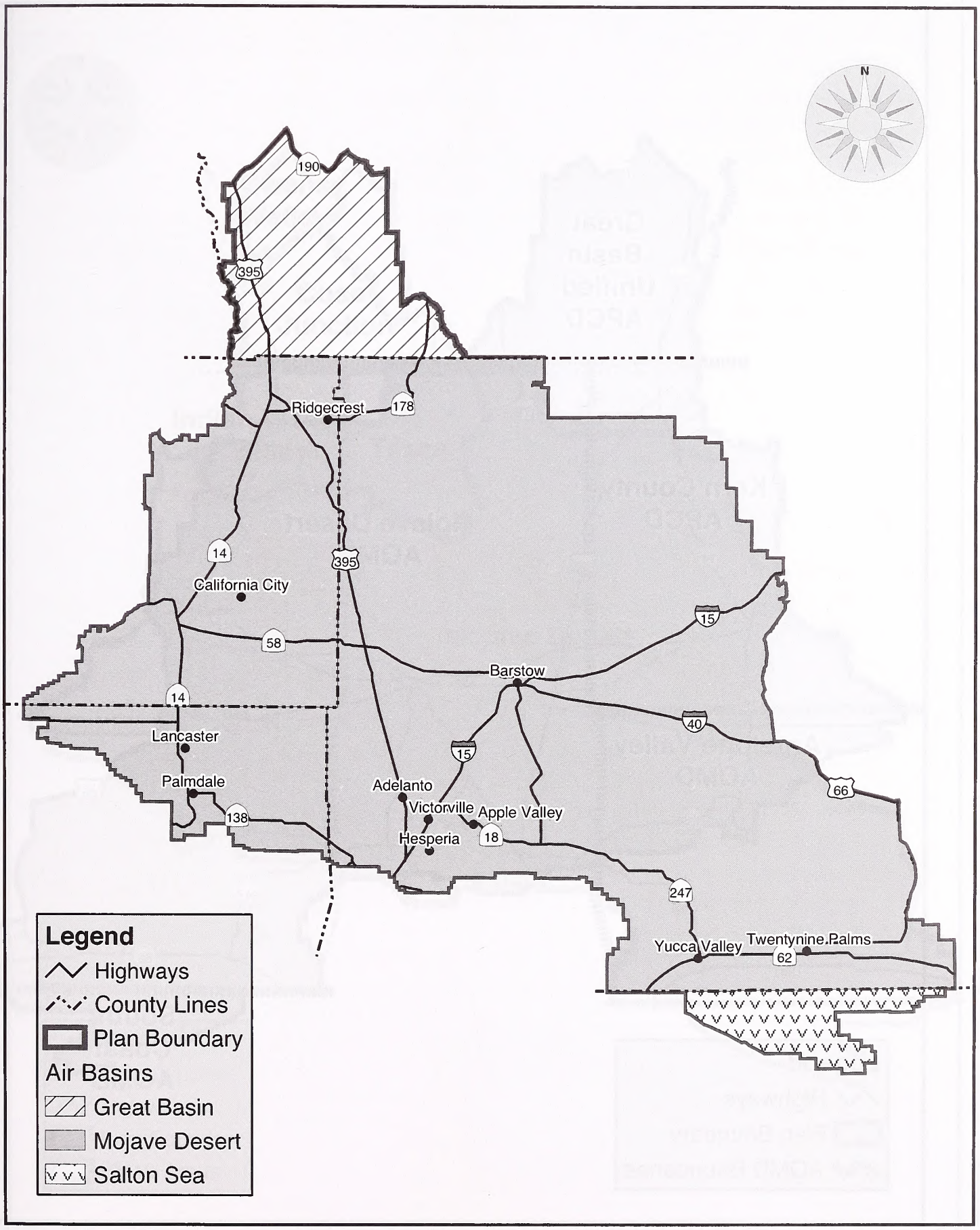
oxides of sulfur (SOx) and reactive organic gases (ROG). The designation of attainment/non-attainment areas for the new PM2.5 and 8-hour ozone standards will occur in the future. The state Air Resources Board has recommended to the USEPA that most of the Mojave Desert Air Basin be classified as federal ozone nonattainment areas under the new 8 hour standard.

The CAA and the California Clean Air Act contain the primary provisions relating to air quality. Among the most important provisions are the sections relating to the establishment of the National and State Ambient Air Quality Standards, nonattainment areas, the development of state implementation plans (SIP), prevention of significant deterioration (PSD), air toxics and federal conformity. The USEPA and the California Air Resources Control Board have issued rules to implement the federal and California Clean Air Acts.

The federal and state Clean Air Acts regulate certain forms of pollution under three main categories. These are criteria pollutants, air toxics and global warming and ozone-depleting gases. There is also regulation of a more general category of emissions that reduce visibility. These come under the titles of regional haze, prevention of significant deterioration (PSD) and visibility reducing particulates (VRP).

The definitions used in determining whether or not an area meets air quality standards are found in the federal and state Clean Air Acts and their associated ambient air quality standards. Criteria pollutants are defined as those pollutants for which the federal and state government have established ambient air quality standards, or criteria, for concentrations in order to protect public health. Under the federal Clean Air Act, the USEPA has established National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants (ozone, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide, nitrogen dioxide, lead and sulfur dioxide). These standards are used to classify all areas as to whether they are in attainment, in nonattainment or are unclassified for any of the NAAQS. California has established California Ambient Air Quality Standards for the same federal criteria pollutants plus an additional 3 pollutants (visibility reducing particulates, sulfates and hydrogen sulfide). The Ambient Air Quality Standards for California are stricter than the federal standards (see Table 3-7).

Air Basins

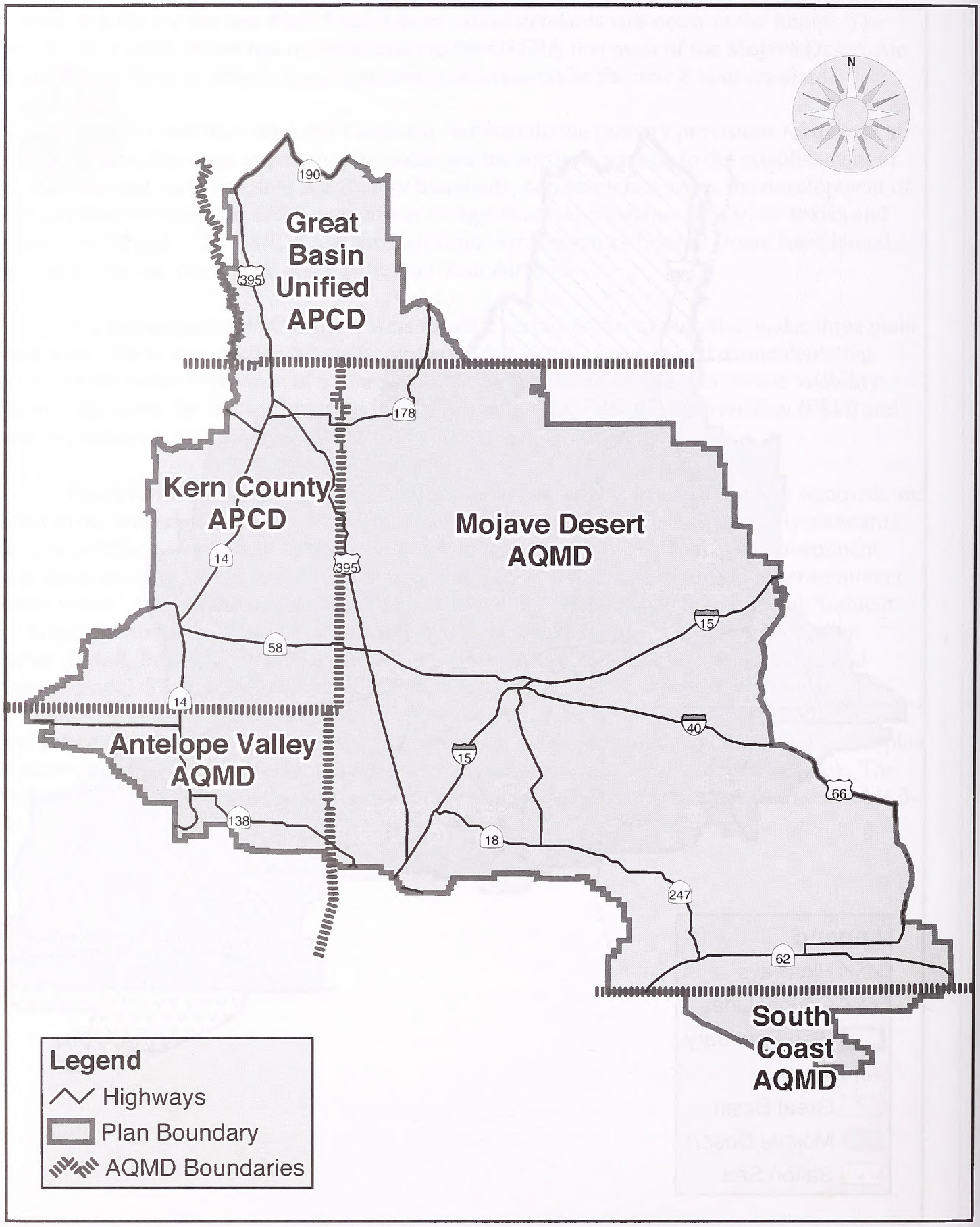


West Mojave Plan FEIR/S
Map 3-2

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Air Quality Management Districts



West Mojave Plan FEIR/S
Map 3-3

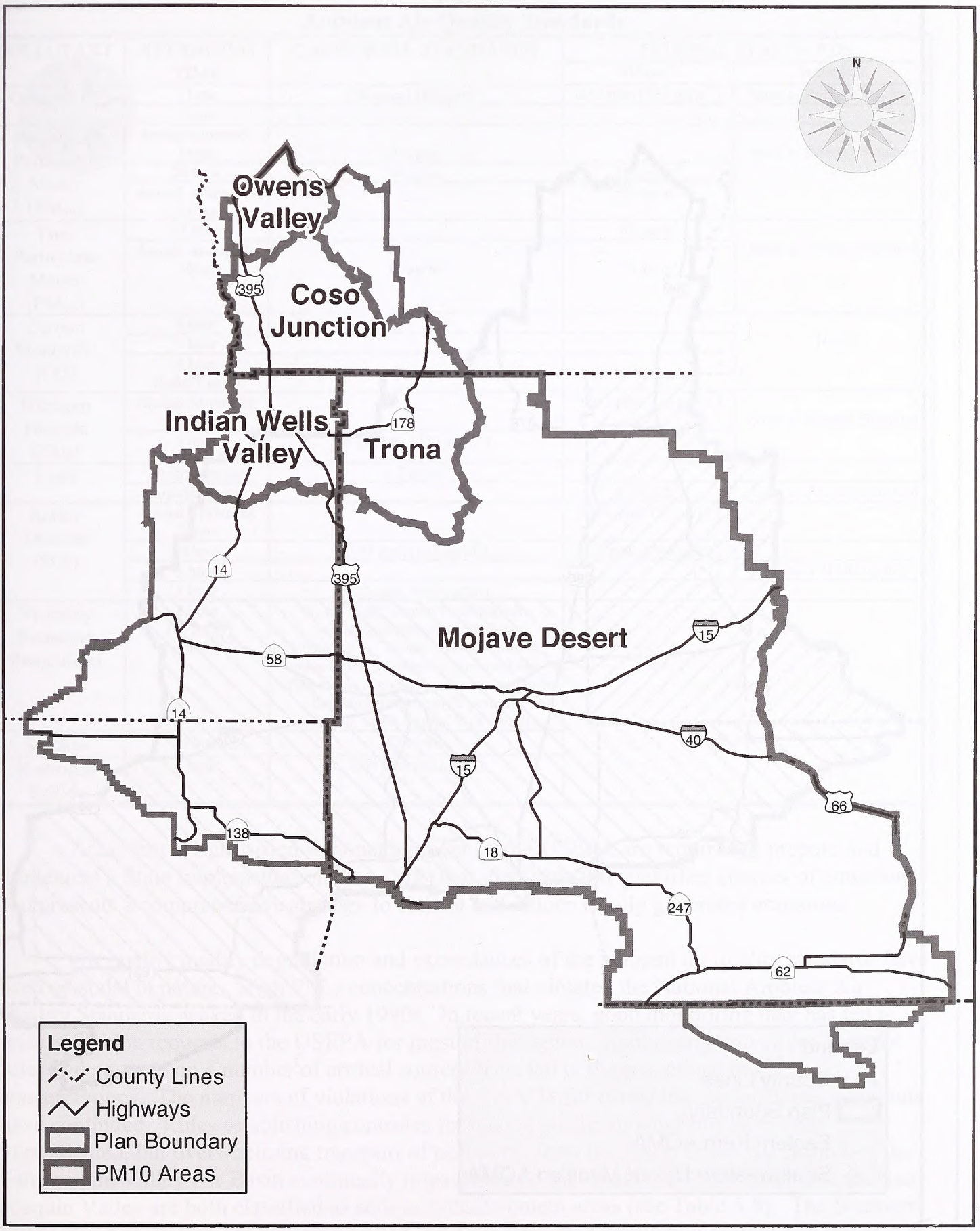
Scale: 1 : 1,750,000

0 10 20 30 Km

0 10 20 30 Miles

7/29/04

Federal PM10 Planning Areas



West Mojave Plan FEIR/S
Map 3-4

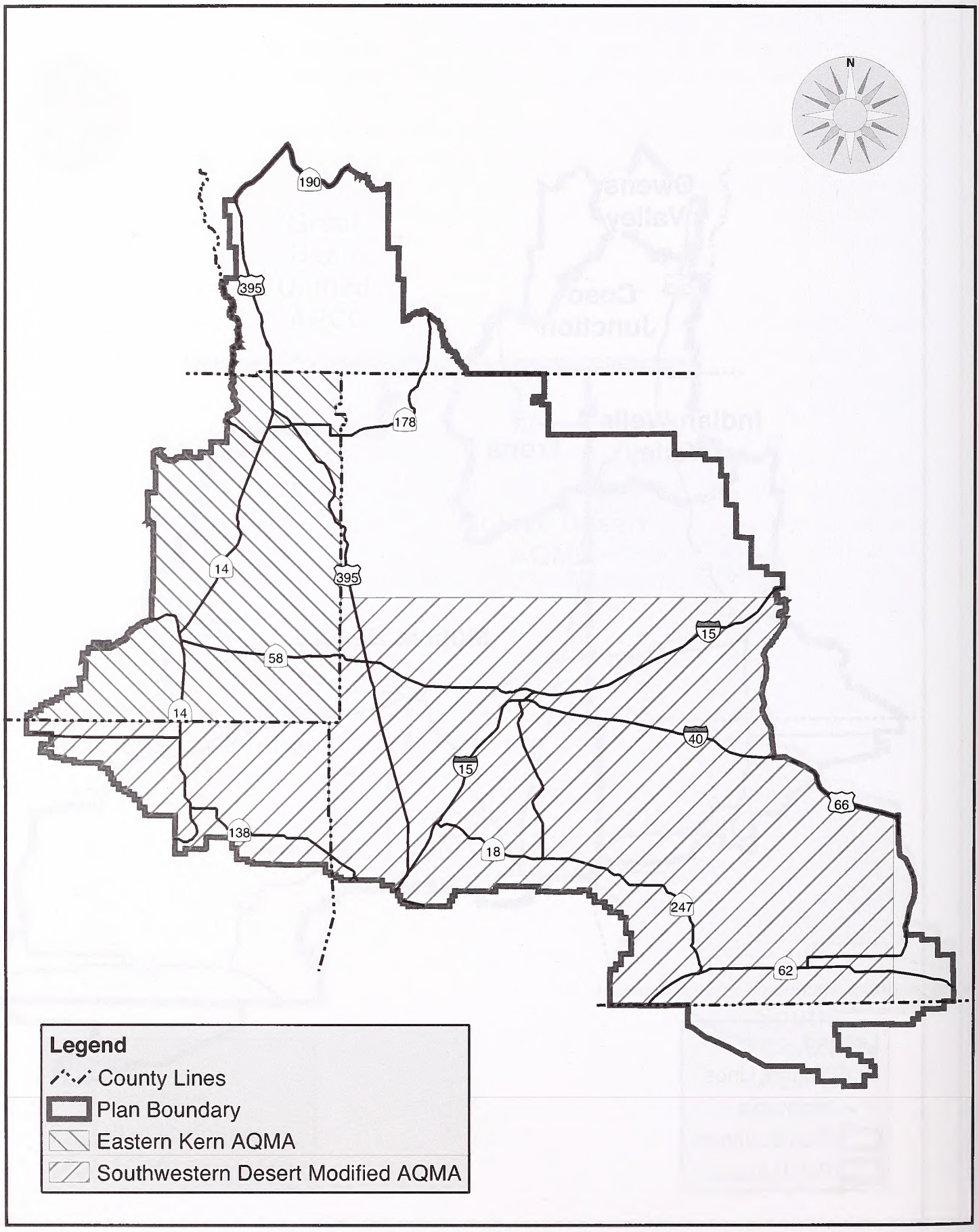
Scale: 1 : 1,750,000

0 10 20 30 Km

0 10 20 30 Miles

7/29/04

Federal Ozone Planning Areas



West Mojave Plan FEIS
Map 3-5

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Table 3-7
Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS	FEDERAL STANDARDS	
			Primary	Secondary
Ozone (O_3)	1 hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	Same as Primary Standard
	8 hour			
Respirable Particulate Matter (PM_{10})	Annual geometric Mean	20 µg/m^3	----	Same as Primary Standard
	24 hour	50 µg/m^3	150 µg/m^3	
	Annual Arithmetic Mean	----	50 µg/m^3	
Fine Particulate Matter ($PM_{2.5}$)	24 hour		65 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	8 hour			None
	8 hour			
	8 hour (Lake Tahoe)			
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	----	0.053 ppm (12 µg/m^3)	Same as Primary Standard
	1 hour	0.25 ppm (470 µg/m^3)		
Lead	30 day average	1.5 µg/m^3		
	Calendar quarter		1.5 µg/m^3	Same as Primary Standard
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean		0.030 ppm (80 µg/m^3)	
	24 hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	
	3 hour			0.5 ppm (1300 µg/m^3)
	1 hour	0.25 ppm (655 µg/m^3)		
Visibility Reducing Particulates	8 hour (10 am to 6 pm, PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer ___ visibility of ten miles or more (0.07_30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70 percent. Method: ARB method V (8/18/89)	No Federal Standards	
Sulfates	24 hour	25 µg/m^3		
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m^3)		

Areas that are classified as nonattainment by the USEPA are required to prepare and implement a State Implementation Plan (SIP) that identifies and quantifies sources of emissions and presents a comprehensive strategy to control and reduce locally generated emissions.

Air quality quality degradation and exceedances of the ambient air quality standards have been episodal in nature. High PM_{10} concentrations that violated the National Ambient Air Quality Standards peaked in the early 1990s. In recent years, good monitoring data has led to reclassification requests to the USEPA for most of the region. Implementation of dust control rules and controls on a number of critical sources have led to the reductions in PM_{10} concentrations. The numbers of violations of the NAAQS for ozone has declined, but violations have continued. Rules establishing controles for Ozone precursor enissions have been implemented, but overwhelming transport of pollutants from the South Coast Air Basin and the San Joaquin Valley Air Basin continually impacts the desert. Both the South Coast and the San Joaquin Valley are both classified as serious nonattainment areas (see Table 3-8). The Southern California Association of Governments (SCAG) has projected population growth and future

pollution levels through 2025. The projections are for a population increase of over 50% a reduction in ozone precursor levels over 30% and increases in PM_{10} levels of nearly 30%.

Table 3-8
Attainment Status By Air Basin and Air District

AIR BASIN	AIR QUALITY DISTRICT	POLLUTANT	PLANNING AREA NAME	FEDERAL DESIGNATION	STATE DESIGNATION
GBVAB	GBUAPCD	PM_{10} (federal)	Owens Valley	Severe Nonattainment	
		PM_{10} (federal)	Rose Valley	Moderate Nonattainment	
		PM_{10} (state)	GBVAB		Nonattainment
		All others	GBVAB	Unclassified/ attainment	Attainment
MDAB	KCAPCD	PM_{10} (federal)	Indian Wells Valley	Moderate Nonattainment	
		PM_{10} (state)	MDAB		Nonattainment
		Ozone (federal)	Eastern Kern County*	Nonattainment	
		Ozone (state)	MDAB		Nonattainment
		All others	Eastern Kern County	Unclassified/ attainment	Attainment
	MDAQMD	PM_{10} (federal)	Searles Valley	Moderate Nonattainment	
		PM_{10} (federal)	Mojave Desert	Moderate Nonattainment	
		Ozone (federal)	Mojave Desert modified	Nonattainment	
		Ozone (state)	San Bernardino Co. Wide		Nonattainment
		Sulfates (state)	Searles Valley		Nonattainment
		Hydrogen Sulfide (state)	Searles Valley		Nonattainment
		PM_{10} (state)	San Bernardino Co. wide		Nonattainment
		All others	MDAQMD Wide	Unclassified/ attainment	Nonattainment
	AVAQMD	Ozone (federal)	Mojave Desert modified	Nonattainment	
		PM_{10} (state)	Basin wide		Nonattainment
		Ozone (state)	Basin wide		Nonattainment
		All Others	Basin wide	Unclassified/ attainment	Nonattainment

AIR BASIN	AIR QUALITY DISTRICT	POLLUTANT	PLANNING AREA NAME	FEDERAL DESIGNATION	STATE DESIGNATION
SSAB	SCAQMD	Ozone (federal)	Coachella Valley	Nonattainment	
		PM_{10} (state)	SSAB		Nonattainment
		Ozone (state)	SSAB		Nonattainment
		All others	SSAB	Unclassified/ attainment	Attainment

Respirable Particulate Matter (PM_{10}): PM_{10} is the most important air pollutant in the West Mojave planning area. PM_{10} in the atmosphere can be caused by both environmental factors and human activities. Human activities that contribute to the PM_{10} emissions include combustion sources such as stack emissions, diesel exhaust and smoke from prescribed fire and wild fire, fugitive dust sources such as construction and demolition activities, off highway vehicle (OHV) travel, unpaved public roads and parking lots, industrial activities, OHV open areas and military activities. The combustion sources tend to produce smaller particulates (less than 5 μ) while fugitive sources tend to produce larger particulates (larger than 5μ).

One of the reasons for the concern with PM_{10} emissions is their adverse effect on human health. All of the PM_{10} particles are considered respirable particulate because they can be inhaled into the nose, throat and/or lungs. The fine PM_{10} particles are the largest threat to health because they tend to deposit in the air sacks. In addition, many of the fine particles are from precursor emissions many of which are toxic or carcinogenic. Fugitive dust is primarily coarse particulate that is not as likely to contain toxic materials. The newest studies report that a 100μ gm/m^3 increase in daily PM_{10} concentrations would increase mortality by 10%. The state PM_{10} standards are considered public health goals. The USEPA has established new NAAQS standards for $PM_{2.5}$ emissions. These standards are for particles at or below 2.5 μ. These fine particles have been implicated as an increased health risk and consist of chemical compounds that mostly result from combustion processes.

Nearly all of the planning area has recorded concentrations of PM_{10} in excess of the national and state ambient air quality standards for PM_{10} emissions. The USEPA has classified five areas within the West Mojave planning area as federal PM_{10} nonattainment areas. The five current federal nonattainment areas are: the Owens Valley PM_{10} Planning Area, the Coso Junction PM_{10} Planning Area, the Indian Wells Valley PM_{10} Planning Area, the Trona PM_{10} Planning Area and the San Bernardino County PM_{10} Area. The Owens Valley planning area is one of five serious federal nonattainment PM_{10} planning areas in the nation. Southeast Kern County and northeastern Los Angeles County (Antelope Valley) are currently listed as unclassified by the USEPA.

The Antelope Valley Area has recorded levels above the national threshold, but has not been classified as nonattainment by USEPA yet. The air quality management district has been working directly with USEPA to successfully reduce the PM_{10} concentration levels and avoid having the Antelope Valley Planning Area designated as a federal nonattainment area. Part of this effort is through the adoption and implementation of rules to control fugitive dust that

constituted a majority of the total PM_{10} emissions.

The original Searles Valley PM_{10}Planning Area abutted the Owens Valley PM_{10} Planning area on the north and included Rose Valley, Indian Wells Valley and Searles Valley. The USEPA recently broke the federal nonattainment area into three separate nonattainment areas based upon the county lines. These three new federal nonattainment areas are called the Coso Junction, the Indian Wells Valley and the Trona PM_{10} nonattainment areas. Emission sources identified in the SIP include construction/demolition, public unpaved roads, paved roads, mobile sources, unplanned fires, public disturbed areas, fuel combustion (cogeneration boiler and stacks at Trona), North American fugitive, industrial roads, agricultural fields and military activities. In 1990 there was an estimated 3.98, 4.76 and 9.18 tons/day of PM_{10} emissions in the Coso Junction, Indian Wells Valley and Trona nonattainment areas respectively. Activities on BLM lands are estimated to contribute 8% of the total PM_{10} emissions in the Trona nonattainment area. The primary source of BLM emissions is OHV activity and unpaved road travel in the Spangler Hills Open Area and surrounding areas. The Trona PM_{10} SIP targets the BLM emissions for a 20% reduction. The Kern County APCD and Mojave Desert AQMD have developed rules to implement the SIPs. Current monitoring data has not indicated any recent exceedances of the NAAQS in any of these three nonattainment areas. As a result, documents have been prepared for the three areas requesting a reclassification from nonattainment to maintenance.

The USEPA classified the San Bernardino County desert area as a PM_{10} non-attainment area on January 20, 1994. The Mojave Desert AQMD prepared a "Particulate Matter (PM_{10}) Control Strategy Plan" and submitted it to the state for inclusion into the state SIP. The USEPA recently disapproved the plan and returned it to the Mojave Desert AQMD for revision. Emission sources identified in the plan include construction/ demolition, city and county unpaved roads travel and wind erosion, paved road entrainment, city and county disturbed areas and industrial activities. Four BLM open areas (Stoddard Valley, Johnson Valley, Rasor, and El Mirage) are within the nonattainment area and the West Mojave planning area. The draft plan called for BLM to prepare a Dust Control Plan for activities within the core problem area of the nonattainment area. At the present time there is no approved SIP for the nonattainment area to guide actions there. Currently new rules are being drafted to come into compliance with USEPA. These new rules will likely require BLM to prepare dust control plans for the entire federal nonattainment area.

Ozone: The South Coast Air Basin and the San Joaquin Valley Air Basin are both federal non-attainment areas for ozone. Much of the ozone pollution in the desert has been transported in from those two areas. Several studies have looked at the ozone pollution problem in the desert areas. The studies show that the peak ozone levels do not correspond to the peak temperatures and ultraviolet (UV) levels, but are occurring much later in the day indicating that the ozone is being formed down wind and is being transported into the area from its source by the prevailing winds. Heavily impacted areas by ozone transport include the Victorville-Barstow area, the Antelope Valley and Joshua Tree National Park. The NAAQS for ozone do not recognize transport as a factor in their standards. As a result, the USEPA has classified most of the Salton Sea and Mojave Desert Air Basins as non-attainment areas for ozone. The only exception is a strip along the northern and eastern edge of San Bernardino County that is excluded from the federal ozone nonattainment area. The state standards allow for the

subtraction of transported ozone in determining attainment / nonattainment areas. However, the state standards are much tighter. As a result, all of the West Mojave planning area outside of Inyo County is in nonattainment of the California ozone standards.

Conformity Determination: The classification of an area as a federal nonattainment area brings an additional requirement for federal agencies. Section 176(c) of the Clean Air Act (CAA), as amended (42 U.S.C. 7401 et seq.), and regulations under 40 CFR, part 93,subpart W, state that "no department, agency or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan." This means that under the CAA 176(c) and 40 CFR, part 93, subpart W, (conformity rules), federal agencies must make a determination that proposed actions in federal nonattainment areas conform to the applicable implementation plan (SIP) before the action is taken.

3.2.2 Geology and Soils

Regional Geologic Overview: The West Mojave planning area is mainly in the Mojave Desert geomorphic province (Mojave Block) of California. However, it takes in a substantial portion of the Basin and Range province to the north, and overlaps with the Sierra Nevada province to the northwest and the Transverse Ranges to the southwest. The geomorphology of the province is dominated by broad basins filled with sediments shed from adjacent highlands and mountains, burying the old topography. The region may once have been a part of the Basin and Range province until separated from it when the Garlock Fault became active in the early to mid Tertiary Period. Although Paleozoic and early Mesozoic-age rocks are present, the desert itself is a Cenozoic-age feature, formed as early as the Oligocene, presumably from movements related to the San Andreas and the Garlock faults. During the Pleistocene (Ice Ages) this region of California had a cooler average temperature and lesser evaporation rate than present. While never a wet climate, it nonetheless once contained many small lakes, and the Mojave River still had water in it. The majority of the surface in the planning area is covered by Quaternary-age unconsolidated surficial deposits. These deposits are comprised primarily of alluvial, fluvial, lacustrine and aeolian derived material.

The *Mojave Desert province* can be divided into western and eastern portions. The "western Mojave" lies within the wedge where the San Andreas and Garlock faults meet, and is bounded on the east by the Mojave River and a line running northwest from Barstow to Red Rock Canyon (Sharp, p.28). Uplifts along the two major fault systems include the El Paso Mountains along the northwest side of the Garlock fault, and the San Gabriel and San Bernardino Mountains along the southwest side of the San Andreas fault. The western Mojave consists of great expanses of gentle surface with isolated knobs, buttes, ridges, and local hilly areas. The "eastern Mojave" consists of alluvial filled basins (downthrown blocks) between mountain ranges separated by normal faults, but includes thrust-fault-emplacement basin and ranges. In the southern half, the mountain ranges have a general northwest trend, whereas in the northern half these features have no consistent orientation. For more detailed geology, the reader is referred to the Geologic Map of California, San Bernardino Sheet (Bortugno and Spittler, 1986).

Basin and Range province is a geologic term referring to the structure of this province's valleys (basins) and mountains (ranges) aligned roughly north to south. The province extends from the Wasatch Mountains of Utah to the eastern side of the Sierra Nevada in California. This part of North America is a region where the earth's crust has been extended (stretched thinner) from east to west, and mountain ranges in this province are generally bounded by faults associated with this thinning and stretching. The planning area north of the El Paso Mountains and east of U.S. Highway 395 is part of the Basin and Range province. This includes the Coso Mountains, the Argus Mountains, the Slate Mountains and their adjacent valleys. The Coso Mountains consist largely of igneous/volcanic rocks, including pumice, basalts, cinders and obsidian, and is tectonically active with frequent, very small earthquakes. The Argus and Slate Ranges are mostly igneous/granitic rocks, with some volcanic rocks and exposures of limestone formations. Searles Valley is well known for its deposits of sodium minerals, which are the remnant of a Pleistocene lake that once formed the terminus of the Owens River.

The *Transverse Range* region is one of eastward-trending mountain ranges and valleys. It is so named because this trend is transverse to the generally northwesterly trending features of southern California. The lowlands of the San Bernardino and Los Angeles plains of the eastern part of this region rise abruptly northward to the San Bernardino and San Gabriel Mountains, respectively, two of the most rugged and highest ranges in southern California. The rock units of the Transverse Range region may be divided into two main groups, (a) crystalline basement complex composed of metamorphic and plutonic rocks, and (b) sedimentary and volcanic rocks. The metamorphic rocks of this complex include, from oldest to youngest, Precambrian gneiss and marble, Precambrian Pelona Schist, Paleozoic metasedimentary rocks hosting gold mineralization, and marble/limestone used for cement, specialty fillers and extenders, chicken grit, and aggregate, and Pre-Cenozoic rock (Dibblee, 1970, p. 36).

In summary, the age of the rocks within the area ranges from Precambrian to Recent and is characterized by great diversity including marine and nonmarine sedimentary rocks and a wide variety of volcanic and intrusive igneous rocks. The geologic events include those related to plate collision, metamorphism, and faulting. This diversity of rock types, long history of igneous activity, and the complex structural and geomorphic development of the region have resulted in the formation of a wide variety of mineral assemblages and their concentration to form the ore deposits that are present in the study area. Characteristics of favorable geologic environments, or "permissive terrains", for the potential occurrence of mineral resources in the area are discussed in an unpublished U.S. Geological Survey report (Tosdal, et al, 1992, 21 p.).

Soils: Soil surveys have been completed by the United States Department of Agriculture, Natural Resource Conservation Service on less than half of the planning area. Published soil surveys include the Southeastern Part of Kern County, San Bernardino County Mojave River Area, Fort Irwin National Training Center, Edwards Air Force Base, and the Marine Corps Air Ground Combat Center Twentynine Palms. Because of the large area within the Mojave Planning Area and incomplete soil survey coverage, general soil information will be used and extrapolated in areas that are not covered by soil surveys for this analysis.

The general soil information and maps provide information on broad areas that have a distinctive pattern of soils, relief, and drainage. Many different kinds of soil have formed thought the planning area. Ongoing soil forming processes are evident in desert soils. Several processes are involved in the formation of soils. These processes are the accumulation of organic matter, the formation of and translocation of silicate clay, the accumulation of silica and lime, weathering of parent material and the formation of desert pavement. General soils are divided into mapping units that represents a unique natural landscape. Typically a mapping unit consists of one or more major soils or miscellaneous areas and some minor soils. The soils in any map unit may differ from place to place in slope, depth, drainage, and other characteristics that affect management. The general map units have been grouped for broad interpretive purposes.

The San Bernardino County Mojave River Area is comprised of three groups:

- Soils of the Mojave Desert on flood plains, alluvial fans, and terraces and in basins are dominantly in low positions in arid areas and are comprised of seven map units. Slopes are nearly level to strongly sloping. Elevation ranges from about 1,700 feet to about 4,000 feet. Soils are very deep and shallow and are moderately to somewhat excessively drained. The surface layer is sand, loamy sand, loamy fine sand, sandy loam, loam, and clay. Soils are used mainly for irrigated crops, homesite development, wildlife habitat, and livestock grazing.

- Soils of the Mojave Desert on old terraces that have a desert pavement and on alluvial fans, foothills, and mountains are dominantly on scattered rock desert uplands on adjacent high terraces in the central and northern parts of the survey area. Elevation ranges from about 1,800 to 4,500 feet. The four mapping units in this group range in depth form very shallow, shallow, moderately deep to very deep. They are well drained with the surface layer is gravelly sand, very gravelly sand, cobbly sandy loam, gravelly sandy loam, sandy loam, and loam. Soils are used for wildlife habitat, grazing, and a source of gravel.

- Soils of the San Gabriel and San Bernardino Mountains on mountains, foothills, alluvial fans, and terraces are gently sloping to steep and range in elevation from 3,400 to 6,200 feet. The four mapping units in this group are moderately deep and very deep and are well drained and somewhat excessively drained. The surface layer is sandy loam and loamy fine sand. Soils are used for wildlife habitat, grazing, homesite development, irrigated crops and pasturelands.

The Southeastern Part of Kern County Soil Survey is comprised of two groups within the West Mojave Planning Area:

- Soils of the Mojave Desert occupy several different landscapes that range from low basins to high mountain ridges. Seven mapping units are incorporated into this group. Soils are nearly level to very steep ranging from 2,000 to 4,200 feet elevation and are shallow, deep, or very deep, and well to excessively drained. Surface layers range from

sand to clay loam. Soils are used for rangeland, recreation, or wildlife habitat. Where water is available, a few of the soils are used for cropland or homesites.

Soil limitations include a high susceptibility to soid blowing of the sand surface layers and excessive erosion hazard due to slopes with inadequate plant cover.

- Soils on the Eastern Foot Slopes of the Sierra Nevada and Tehachapi Mountains are dominantly strongly to very steep with some soils in mountain valleys that are nearly level. Elevation ranges from 2,000 to 8,000 feet. Soils are shallow to very deep and well drained to somewhat excessively drained. Surface layers are gravelly sandy loam, gravelly loam, or sandy loam. Four mapping units in this group are used for woodland, rangeland, recreation, and wildlife habitat. Those soils in the more level mountain valleys are used irrigated cropland.

The Fort Irwin National Training Center Soil Survey is comprised of five groups and can be used to extrapolate information about soils for surrounding areas:

- Soils in basins and on basin rims are comprised of one mapping unit occupying alluvial flats, fan skirts, and playas landforms. Soils are somewhat poorly to excessively drained, very deep soils formed in mixed alluvial or lacustrine materials on nearly level to gentle slopes. Surface layers are sandy loam to fine sandy loam, coarse sand, loamy coarse sand, silty clay loam, silty clay or clay.

- Soils on alluvial fans and alluvial fan remnants are comprised of four mapping units. The surface layer is composed of sand, coarse sand, loamy coarse sand, sandy loam, loamy sand, loam, or silt loam. Soils are well drained and very shallow to very deep and are gently to strongly sloping.

- Soils on granitic pediments and inselbergs are comprised of one mapping unit somewhat excessively drained, very shallow over granitic bedrock soils formed in residuum. The surface layer is coarse sandy loam or sandy loam. Slopes are undulating to steep.

- Soils on fan remnants, erosion remnants, and ballenas are comprised of two mapping units. Landforms are undulating to hilly with very shallow to very deep, well-drained soils. Surface layers are loamy coarse sand, coarse sandy loam, sandy loam, or loam.

- Soils on hills and mountains are comprised of three mapping units. Landforms are rolling to very steep with very shallow to shallow well drained to excessively well-drained soils. Surface layers are sand clay loam, sandy loam, or loam.

Soils within the training center are used for military exercises and wildlife habitat. Soils outside the training center are most likely used for grazing, wildlife habitat, recreation, and homesite development.

The Marine Corps Ground Combat Center Twentynine Palms are comprised of three groups:

- Soils on bolson floors are comprised of one mapping unit with very deep, clayey or coarse loamy, salt affected soils formed in lacustrine deposits. The landform setting is smooth lake plains and playas. Elevation ranges from 600 to 2,900 feet. Soils are somewhat poorly drained to well drained.

- Soils on fan piedmonts are comprised of five mapping units located on fan remnants, alluvial fans, and fan aprons. Soils are very shallow to very deep, well to excessively drained. Elevation is 1,800 to 4,000 feet with gently to moderately steep slopes. Surface layers are coarse sand, loamy sand, loamy fine sand, loamy coarse sand, sandy loam, extremely gravelly sand, very gravelly sandy loam.

- Soils on mountains and hills are comprised of three mapping units. Soils are very shallow to bedrock, well drained to somewhat excessively drained. Elevation is 800 to 4,600 feet with moderate to steep slopes. Surface layers are extremely gravelly sand, very cobbly fine sandy loam, very gravelly loamy coarse sand, or extremely stony sandy loam.

The Edwards Air Force Base Soil Survey is comprised of three basic geomorphic units. These include the hills and rock pediments are scattered throughout the area and are surrounded by fan piedmonts and sand sheets, which for the most part internally drained to the alluvial flats and ultimately to the playas.

- The hills and rock piedments tend to be moderately steep, to steep. Soils are shallow or moderately deep; therefore, water runoff is somewhat high.

- The fan piedmonts and sand sheets are rarely flooded during thunderstorms when water moved from the surrounding hills and rock pediments down slope toward to the playas. Drainage of soils on these landscapes is somewhat to excessively drained.

- The alluvial flats between the playas and surrounding fan piedmonts and sand sheets are subject to occasional flooding as water moves down slope to the playas. Ponding occasionally occurs on the alluvial flats. Soils on the alluvial flats are dominantly moderately well drained.

Soil blowing is a major hazard in the survey area; especially those with coarse-textured surface layer of loamy fine sand and sand and are susceptible to soil blowing. Wind erosion occurs whenever bare, loose, dry soil is exposed to wind of sufficient speed to cause soil movement. The process will be accelerated whenever the natural equilibrium between climate, soils, and vegetation is disturbed. Wind speeds as low as 13 to 15 miles per hour one foot above the soil surface can initiate soil blowing under highly erodible conditions. The mere passing of vehicle tires or tracks over an erodible surface provides sufficient energy to initiate soil blowing. As medium size particles are detached they may enter the wind stream momentarily but then are

pulled back by gravity. This causes them to impact other particles and set them into motions and can account to 50 to 80 percent of total soil movement. (NRCS, 29Palms)

3.2.3 Water

The planning area is one of the most arid areas in the nation; the potential annual water loss through evapotranspiration exceeds the annual water gain from precipitation even at the higher elevations. On the valley floor the evaporation exceeds the precipitation by at least 25:1.

Prominent mountain ranges have an important influence on moisture distribution within the plan area. As moist, unstable air masses from the Pacific Ocean rise up the windward slopes of the Southern Sierra, San Gabriel and San Bernardino Mountains, the air is cooled and water vapor condenses and falls as rain, snow, or ice. When these air masses descend the leeward slopes, they become warmer and more stable and thus retain most of the remaining moisture. Consequently, precipitation amounts are much greater on the windward slopes of the mountain ranges, whereas arid conditions prevail leeward of the mountains. All of the study area, except the Kelso Creek area is on the leeward side of these major mountain areas.

Because of the arid nature of the study area, water supply is the single most important resource. The presence or absence of a reliable supply of good quality water has determined the pattern of agricultural, urban, and industrial development and will continue to do so. Groundwater withdrawn by wells furnishes nearly all of the developed water. Many of the State or federally listed or BLM sensitive species, discussed elsewhere in this document, are dependent upon the presence of groundwater either directly or for their habitat.

Surface water is very scarce. Streams that originate high in surrounding mountains on the west and south may have perennial flow in the higher altitudes; at the lower altitudes and throughout the area virtually no water exists in streambeds or riverbeds, except locally after infrequent, heavy cloudbursts. The playas may be covered by water from the runoff for as long as two months a year. There are many locally important springs and seeps most of which are associated with the mountain areas.

3.2.3.1 Groundwater Basins

The water yielding materials in this area are in valleys and basins, and consist primarily of unconsolidated alluvial-fan deposits, although locally flood plain and lacustrine (lake) beach deposits may yield water to wells. The valleys and basins are internally drained; that is, water from precipitation that falls within the basin recharges the aquifer and ultimately discharges to the land surface and evaporates within the basin. Ground water is generally under unconfined, or water table, conditions at the margins of the basins, but as the unconsolidated deposits become finer grained toward the centers of the basins, the water becomes confined. Rarely, basins might be hydraulically connected in the subsurface by fractures or solution openings in the underlying bedrock. These multiple-basin systems end in a terminal discharge area, or sink, from which water leaves the flow system by evaporation. Along the Mojave River several basins or valleys are hydraulically connected, and ground water flows between the basins, mostly through the unconsolidated alluvial stream/flood plain sediments of the present and ancient river.

The most permeable basin-fill deposits are present in the depressions created by late Tertiary to Quaternary block faulting and can be classified by origin as alluvial fan, lake-bed, or fluvial deposits. At the time of major deposition, the climate was more humid than the modern climate. Lakes were in most of the closed basins and streams connected some basins. In general, the coarsest materials (gravel and boulders) were deposited near the mountains, and the finer materials (sand and clay) were deposited in the central parts of the basins or in the lakes. Occasionally, torrential storms produced heavy runoff that carried coarse material farther from the mountains and resulted in the interfingering of fine and coarse material. The distribution of sediment size is directly associated with distance from the mountains. Three geomorphic landforms can be distinguished on the basis of the gradient of the land surface. Alluvial fans border the mountains and have the steepest surface slopes and the coarsest sediments. Basin ward, individual alluvial fans flatten, coalesce, and form alluvial slopes of moderate gradient. A playa, or dry lakebed with a flat surface, is present in the lowest part of the basin, usually at or near the center of the basin, and most of the sediment deposited on the playa is fine grained. Parts of some of the valleys become encrusted to a depth of several inches with alkaline salts, which cover the surface as a powdery crust.

The most important hydrologic features of the basins are the alluvial fans. The basin fill receives most of its recharge through the coarse sediments deposited in the fans. These highly permeable deposits allow rapid infiltration of water as streams exit the valleys that are cut into the almost impermeable rock of the surrounding mountains and flow out onto the surface of the fans. The coarse and fine sediments within the alluvial fans are complexly interbedded and interfingered because the position of the distributary streams that transported the sediments continually shift across the top of the fan as a result of scour or deposition of sediment during floods.

Material deposited in perennial lakes or in playas consists principally of clay and silt with minor amounts of sand and is present in all of the basins. In most places, these sediments include some salts deposited by evaporation. The clay and salt deposits merge laterally into coarse-grained deposits of the alluvial slopes. Minor well-sorted beach sand and gravel are in the subsurface near the shores of once perennial lakes.

Except for the Mojave River that has a complex surface water/groundwater relationship, water is not discharged to major surface water bodies but is lost solely through evapotranspiration. Each basin has essentially the same characteristics: the impermeable rocks of the mountain ranges serve as boundaries to the flow system, and the majority of the ground water flows through basin-fill deposits. Most recharge to the basin-fill deposits originates in the mountains as snowmelt, and, where the mountain streams emerge from bedrock channels, the water infiltrates into the alluvial fans and replenishes the basin-fill aquifer. Intense thunderstorms may provide some direct recharge to the basin-fill deposits, but, in most cases, any rainfall that infiltrates the soil is either immediately evaporated or taken up as soil moisture; little water percolates downward through the unsaturated zone to reach the water table in the valleys.

Antelope Valley: Antelope Valley, Calif., which is in the Southwest corner of the plan area, is an example of a single, undrained, closed basin. Antelope Valley occupies part of a structural depression that has been down faulted between the Garlock and the Cottonwood--

Rosamond Faults and the San Andreas Fault Zone.

Alluvium and interbedded lacustrine deposits of Quaternary age are the important aquifers within the closed basin and have accumulated to a thickness of as much as 1,600 feet. The alluvium is unconsolidated to moderately consolidated, poorly sorted gravel, sand, silt, and clay. Older units of the alluvium are more compact and consolidated, somewhat coarser grained, more weathered, and more poorly sorted than the younger units. The rate at which water moves through the alluvium (the hydraulic conductivity of the alluvium) decreases with increasing depth.

Two aquifers, which are separated by the lacustrine deposits, are in the alluvial material. The upper aquifer is the principal and most used aquifer and contains water under unconfined, or water table, conditions. Where the lower, or deep, aquifer underlies lacustrine deposits, it contains water under confined, or artesian, conditions. Elsewhere, unconfined conditions prevail.

The use of ground water for agriculture in Antelope Valley began about 1880, when wells were drilled near the center of the valley and yielded flowing water in quantities sufficient for irrigation. In 1891, more than 100 wells were in use, but most had stopped flowing. About 1915, intense use of ground water began when a large number of wells were drilled and equipped with pumps. The maximum rate of withdrawal of about 400,000 acre-feet per year is about 10 times the estimated annual recharge to the basin. Water removed from storage in the aquifers was a major part of the ground-water withdrawals, and severe water-level declines resulted. By about 1950, studies showed that ground-water withdrawals in the valley were greatly in excess of natural recharge and withdrawals were curtailed. The Antelope Valley-Eastern Kern Water District is still serviced by ground water.

Antelope Valley illustrates the potential for overdraft in the groundwater basins in the plan area.

Water Quality: Although there are vast quantities of water within the ground water basins, some of the water is of poor quality. The mineral quality of the ground water within the study area varies greatly. The geologic setting of the basins directly affects the degree of ground water mineralization. In general, basins near the source of recharge are less mineralized than those that are more distant.

Very short flow paths generally characterize small local flow systems, usually no more than a few miles in length. Springs connected to these systems are usually located in or near the mountains and have highly variable annual ranges in discharge which respond to the precipitation that year or a few years previous. Discharge waters have small concentrations of dissolved sodium plus potassium and chloride plus sulfate, large concentrations of tritium, and water temperatures that commonly approach average air temperatures.

Large local flow systems are characterized by interbasin flow or flow confined to one basin with longer flow paths. Springs connected to these systems have moderate concentrations of the major salts, no significant concentrations of tritium and water temperatures from 50 to 60 degrees Fahrenheit.

Surface water was and is the major transport agent of the rock material from the mountains to the alluvial fans to the valleys. The intense short duration storms result in rapid floodwaters that have the energy to transport rock material both in the water column and along the beds of the arroyos. Longer duration storms with less intensity will still have the energy to transport finer sediment materials. All ephemeral streams in this area will have naturally high sediment concentrations. Flows resulting from groundwater sources will have low sediment concentrations until the runoff water predominates the flow. Playa water will usually have a high concentration of very fine sediment mixed into the column by wind action and will have varying salt concentrations depending on the geology of the area.

3.2.3.2 Mojave River

The Mojave River originates near the southern boundary of the plan area. Major watersheds in San Bernardino or San Gabriel Mountains contribute to the streamflow in the area. Sheep Creek originates in the San Gabriel Mountains. The West fork of the Mojave River and Deep Creek originate in the San Bernardino Mountains and are the headwaters of the Mojave River.

The Cajon Fan is at the southern edge of the Mojave Desert, in the southwestern part of the study area. It is a broad surface of coalescing alluvial fans and terraces. Part of the Cajon Fan is called Baldy Mesa. The Cajon Fan formed in sediment eroded from the San Gabriel and San Bernardino Mountains. The fan extends form the base of the mountains for 10 to 15 miles to the Mojave River east of Hesperia to Adelanto and to Mirage Lake. The center part of the upper edge of the Cajon Fan no longer joins the mountains. Tectonic activity in the surrounding area and subsequent erosion have truncated the upper edge to form the Inface Bluffs. Broad washes of the desert, such as the OroGrande Wash, at one time drained large watersheds and are also truncated at the Inface Bluffs.

The Mojave River flows along the eastern edge of the Cajon Fan. The river originates where the West Fork of the Mojave River joins Deep Creek, and it flows northward and then eastward past Barstow. The flood plain of the Mojave River is 0.5 to 1 mile wide along most of the river. The soils on the flood plain are nearly level. In some places, such as at Upper Narrows where the river cuts through hard rock, there is no flood plain. East of Barstow, the flood plain and river terraces form the broad Mojave Valley.

The Mojave River has only 3 major tributaries within the desert – the Fremont Wash, Buckthorn Canyon, and Oro Grande Wash. These Tributaries flow only after intense storms.

The water-bearing alluvial deposits of the Mojave River are a major source of ground water in the study area. Hard rock formations along the river divide the coarse river deposits into numerous subsurface basins. Water from the river recharges these basins.

The above ground flow of the Mojave River is intermittent in most places. Along most of its course, water flows above ground only after storms. Perennial flows occur near Victorville, in the vicinity of Camp Cady and in Afton Canyon. In these places hard rock barriers force ground water to the surface. Other basins in the area from which considerable ground water is

removed are in the area of Lucerne Valley, El Mirage, and Harper Lake.

The amount of water in the Mojave River varies greatly from year to year. As measured at the Forks, it has been more than 300,000 acre-feet one year and less than 10,000 acre-feet another.

The Mojave Water Agency was formed by an act of the State legislature in 1960 to find ways to supplement the natural water supply. The agency has contracts with the State of California that entitle the agency to purchase as much as 50,800 acre-feet of water per year from the California Water Project. The California Aqueduct delivers the water. Three turnouts for water delivery were constructed.

3.3 BIOLOGICAL RESOURCES

The California Desert Conservation Area was inventoried for its flora and fauna in the late 1970s by the BLM Desert Plan staff. A total of 1836 vascular plant species in 116 families and 635 species of vertebrate animals were recorded. The West Mojave planning area was not tabulated separately, but contains a high proportion of the total. The diversity reflects the varied topography and landforms within the planning area. Investigations of invertebrates, such as insects, mollusks and fairy shrimp have been completed for only a few groups, but show widespread endemism and specialization to unique substrates, host plants and water sources. Thousands of additional invertebrate species are present.

The western Mojave Desert historically contained the highest densities of the desert tortoise and the only known populations of the Mohave ground squirrel, the focal species of this Habitat Conservation Plan and CDCA Plan Amendment. It supports one of the largest populations of the prairie falcon. The region contains at least four endemic animals and thirteen endemic plants. A number of disjunct localities exist where plants and animals range into the planning area far from their primary distribution.

Many of the rare species of the western Mojave Desert are concentrated at special sites, where unique substrates, water sources, or topography are present. Several areas have high biodiversity because of location at the desert-mountain transition zone. In addition, the vast open space in much of the western Mojave Desert provides room for species to survive in the harsh desert climate.

The eastern and southern Sierra Nevada Mountains extend into the West Mojave and represent areas of very high biodiversity. In the east Sierra canyons, riparian habitat and springs attract large numbers of nesting and migratory birds, including several target species. These canyons are known to harbor rare salamanders, endemic springsnails, and a high diversity of rodents and reptiles. The Owens Peak area stands out as a region of high endemism for plants. In the southern Sierras, the Middle Knob region is outstanding for its intact assemblage of predators and the Kelso Valley harbors endemic plants, and includes an important migratory flyway for turkey vultures, Cooper's hawks, and Swainson's hawks.

A relatively small number of introduced wildlife species (excluding insects) is found in the western Mojave Desert. A few of these species have very significant effects on the native environment, particularly feral burros, bullfrogs, and brown-headed cowbirds. In addition, feral dogs are a problem in several areas, where they may kill desert tortoises or Mohave ground squirrels. Although common ravens are "natural" predator of tortoises, population levels apparently increased by as much as 1,500% between 1968 and 1988 (BLM 1990). Increased raven populations are likely associated with new water sources (cattle troughs, agricultural fields, wildlife guzzlers), increased scavenging potential (refuse in urbanizing areas, animal carcasses found along highways), and more nesting substrates (transmission lines and a multitude of human structures like houses, abandoned vehicles). The number of invasive introduced plants is higher and in many respects more of a threat to the natural ecosystem. Riparian pests include tamarisk, Russian olive and *Phragmites*, which consume a lot of water and crowd out native willows and cottonwoods. Weedy annuals such as storksbill, several species of brome grass, Sahara mustard and others compete with native wildflowers and provide a nutritionally deficient food plant for the desert tortoise.

Following is a description of the natural communities of the western Mojave Desert, and the life history and status of the desert tortoise, Mohave ground squirrel, and other species addressed by the West Mojave Plan. The summaries of species other than the tortoise and ground squirrel are based on the Species Accounts prepared for this planning effort in 1998 plus subsequent information. Copies of the full species accounts are included on the compact disk attached to this final EIR/S.

3.3.1 Natural Communities

The western Mojave Desert comprises a distinct area of the Mojave Desert biome, where the flora and fauna has adapted to the local conditions and formed distinct natural communities, including species found nowhere else (i.e. "endemics"). It also incorporates the transitional ecotones from the Sierra Nevada, Tehachapi, San Gabriel, and San Bernardino Mountains and the Colorado Desert.

The predominant aspect of the West Mojave is a flat, sparsely vegetated region interspersed with mountain ranges and dry lakes. The area is a part of the high desert, large portions of which lie at elevations between 2500 and 4000 feet. Freezing temperatures are limited to a few days in the winter in most of the region, while summer temperatures regularly exceed 100 degrees Fahrenheit. The characteristic creosote bush and saltbush plant communities are covered with wildflowers in years of above-normal winter rainfall, and up to 90% of the flora are composed of annual plants.

The central and southeastern regions reflect the Pleistocene history of the Mojave River, which flows from the San Bernardino Mountains north to Barstow, then east to Silver Lake and the Mojave National Preserve. In the last Ice Age, extending from 30,000 to 10,000 years ago, the Mojave River discharged to the south into the Mojave Valley, Lavic Lake, Dale Lake, Bristol Lake, and other playas extending nearly to the Colorado River. The river (now dry) and playas supported species of invertebrates, fish, amphibians, and pond turtles, and attracted migratory

birds dependent on water. Remnant populations of these animals are still present today, and comprise many of the rare species in need of conservation. The ancient river and lakes formed sandy beaches and prevailing winds carried the finer particles to the east, forming hummocks and dunes. These blowsand areas now support unique species of insects, plants, and reptiles, including the Mojave fringe-toed lizard, whose entire distribution can be traced to the former path of the ancient Mojave River and Amargosa River.

On the west, the western Mojave Desert exhibits communities reflecting the increased aridity on the east side of the Sierra Nevada and Tehachapi mountains, and the northern flank of the San Gabriel and San Bernardino mountains. These ranges capture rainfall from storms originating in the Pacific Ocean and falling over the coast and inland valleys and prevent all but the larger storms from reaching the desert. The western Mojave Desert is not influenced to a great extent by the summer thundershowers characteristic of the Sonoran Desert and the East Mojave, though infrequent episodic events from summer storms can cause flash flooding, playa filling, and redirection of stream flow on alluvial fans.

The mountainous transition zones within the western Mojave Desert extend downhill from open forests of blue pine in the north and pinon pine in the south, through a chaparral zone, to a diverse mixed woody scrub vegetation at lower elevations, often characterized by dense stands of Joshua trees. Of interest is the presence of many unique plant species in the southern Sierra Nevada, and Central Valley elements of the flora and fauna found in the Antelope Valley, Middle Knob, and Kelso Valley along the west-central boundary of the planning area.

The north and northeastern bioregions exhibit many elements of the Great Basin biome. Sagebrush scrub and plants associated with both the Owens Valley and Death Valley ecosystems extend into the planning area to a limited extent.

A limited expression of the Colorado Desert flora and fauna also extends into the West Mojave east of Twentynine Palms and south through Joshua Tree National Park and Morongo Valley and is prevalent in the proposed Pinto Mountain DWMA. However, the characteristic smoke trees, ocotillos and barrel cacti associated with the low desert are restricted to small regions along the West Mojave boundary.

Noteworthy landforms within the West Mojave include five major lava flows at Pisgah, Amboy, the Rodman Mountains, Black Mountain and Fossil Falls, the largest and flattest playa in the world at Rogers Lake, and sand dunes in several places, including Olancha, along the Mojave River, in the Mojave Valley, and at Twentynine Palms. Deposits of limestone and carbonate rock in the San Bernardino Mountains support several unique species of plants and some of the largest mines in the country. Alkaline seeps, springs, and meadows associated with the San Andreas and other earthquake faults are havens for unusual plants and invertebrates, while occasional fresh water springs support a variety of wildlife, including bighorn sheep.

Thirty-two distinct plant communities are found within the western Mojave Desert. By far the most common communities are creosote bush scrub and saltbush scrub, which occupy 75% of the natural lands. Mojave mixed woody scrub accounts for 13% of the native vegetation. The remaining 29 plant communities are found in isolated areas with unique conditions, such as

freshwater or alkali wetlands, or occur along the south and west edges of the planning area, in the desert-mountain transition. Table 3-9 lists the natural communities and the acreage of each. Map 3-23, found on the attached CD-ROM, illustrates the location of the natural communities. Localized areas having special biological importance are described below.

Alkali wetland sites: CDFG and USFWS botanists, the California Native Plant Society and noted conservation biologist Reed Noss reviewed and discussed conservation plant species in the West Mojave during the planning process. Protection of alkali wetland communities, including seeps, springs, meadows and playas was identified as a top priority. These sites are very likely to result in new discoveries of disjunct and endemic species of rare plants. In addition, the unique conditions that support these communities, including faultline alterations to the water table, hot springs, and local enclosed basins require consideration of protection of ecosystem processes.

Two specific locations, Rabbit Springs and Paradise Springs, are relatively undisturbed alkali seeps known to support many rare species and represent botanical hotspots. Harper Dry Lake is a unique alkali marsh, a community found at few other sites in the Mojave Desert, most notably in Death Valley. Other sites along the Helendale Fault, San Andreas Fault and bordering major desert playas have high potential for discovery of unique elements of the desert flora.

Landforms and Soils: Some distinctive landforms and soil types found within the West Mojave that provide habitat for unique or listed species include:

- Sand dunes at Saddleback Butte, Dale Lake, Mojave River, Mojave Valley, Twentynine Palms, El Mirage, Alvord Mountain, and Pisgah Crater form habitat for Mojave fringe-toed lizard (Dean, 1978).
- Sand sheets at the east edges of playas constitutes habitat for desert cymopterus east of Cuddeback, Rogers, and Harper dry lakes.
- The remnant Pleistocene glacial surfaces at Middle Knob, termed "pebble plains" provide habitat for the extremely rare Kern buckwheat.
- Carbonate rock and soil on the north face of the San Bernardino Mountains provides habitat for several endemic plants, including four listed species.

Table 3-9
Natural Communities and Ownership In The West Mojave (In Acres)

COMMUNITY	PRIVATE	NPS	BLM	STATE	MILITARY	TOTAL
Alkali seep	59	0	0	0	0	59
Alkali sink scrub	5,429	0	5,408	59	16,019	26,915
Big sagebrush scrub	706	0	8,571	144	106,267	114,982
Blackbush scrub	37,576	59,183	35,312	531	73,042	205,644
Chamise chaparral	26,426	0	2,167	0	53	28,646
Cottonwood-willow riparian forest	5,350	0	6,183	0	0	11,533
Creosote bush scrub	1,554,339	48,765	2,350,012	72,304	1,658,226	5,683,646
Desert holly scrub	1,935	0	19,781	0	4,843	26,559
Desert wash scrub	14,067	468	19,894	66	47,182	81,677
Fan palm oasis	33	0	0	0	0	33
Freshwater seep	388	0	0	0	0	388
Gray pine-oak woodland	2,576	0	102	0	0	2,678
Greasewood scrub	706	0	2,780	175	0	3,661
Hopsage scrub	0	0	0	0	5,503	5,503
Interior live oak woodland	556	0	33	0	8	589
Jeffrey pine forest	1,150	0	662	0	0	1,812
Joshua tree woodland	6,755	0	3,275	353	18,443	28,826
Juniper woodland	47,453	0	13,926	154	1,453	62,986
Mesquite bosque	2,977	39	3,688	407	467	7,578
Mojave mixed woody scrub	174,672	127,236	377,250	10,431	409,019	1,098,608
Mojave riparian forest	4,638	0	28	20	242	4,928
Northern mixed chaparral	475	0	517	0	0	992
Pinyon-juniper woodland	73,087	53,943	56,332	601	0	183,963
Pinyon pine woodland	3,135	0	15,151	486	18,956	34,593
Montane meadow	964	0	2	0	8	974
Montane riparian scrub	1377	0	851	0	134	2,362
Native grassland	3,146	0	229	0	0	3,375
Rabbitbrush scrub	7,750	0	0	92	0	7,842
Scrub oak chaparral	22,624	0	13,761	0	0	36,385
Saltbush scrub	393,748	16	193,012	5,138	210,787	802,701
Semi-desert chaparral	108,488	0	19,527	215	0	128,230
Shadscale scrub	162	2	37,457	981	3,656	42,258
TOTAL	**2,502,747**	**289,652**	**3,185,911**	**92,157**	**2,574,300**	**8,640,926**

State includes State Lands Commission, State Parks, and Department of Fish and Game.
Other owners: Unknown = 1,844; County = 1,142; Bureau of Indian Affairs = 166.

3.3.2 Desert Tortoise

3.3.2.1 Regulatory Status

The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California. On August 4, 1989, the USFWS published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 *Federal Register* 32326). In its final rule, dated April 2, 1990, the USFWS determined the Mojave population of the desert tortoise to be threatened (55 *Federal Register* 12178). The USFWS designated critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah in a final rule, published February 8, 1994 (59 *Federal Register* 5820) (USFWS 2002). The tortoise was also listed as threatened throughout its known range in California by the California Fish and Game Commission in 1989.

The desert tortoise is the official California State reptile, and has been protected by special State legislation that prohibits the taking or harming of the species since the 1930s. In 1983, the Desert Tortoise Council petitioned the CDFG to list the desert tortoise as a threatened species. The petition was withdrawn later, pending the federal status review by the USFWS. In August 1987, the Desert Tortoise Council resubmitted the petition to the California Fish and Game Commission (Commission). In November 1987, the Commission accepted the petition for review, and in June 1989, the Commission designated the desert tortoise as a threatened species (BLM and CDFG 1992).

The desert tortoise was designated a "sensitive species" in California in 1979 by BLM, which is authorized to designate species on public lands as "sensitive" after consultation with CDFG. The purpose of the designation was to provide increased management attention to prevent population and habitat declines that might result in federal or State listing as endangered or threatened. The designation raises the level of concern for desert tortoises in the environmental review process. No particular habitat or population management action is required or prohibited by the sensitive species designation, although other federal statutes (such as FESA and CESA) apply (BLM and CDFG 1992).

3.3.2.2 Tortoise Habitat Designations

During the past two decades, the BLM and USFWS have identified habitats that are important to tortoise management, conservation, and recovery. This section describes the establishment of management areas to protect these habitats (see Table 3-10), their intent and function, and relationships to other land designations.

Table 3-10
Current And Historic Tortoise Management Areas

NAME	DATE ESTABLISHED	NOTES
Crucial Habitat	1980	California Desert Conservation Area Plan Designation
Category I, II, and III	1993	California Desert Conservation Area Plan Designation
Critical Habitat	1994	Designation pursuant to FESA
Recovery Plan	1994	Suggests that DWMAs be established

BLM Crucial Habitat: Desert tortoise *crucial habitat* was first identified in the BLM's 1980 CDCA Plan (Map 4, CDCA Plan, 1980). The crucial habitat area was considered to be "...essential to the continued existence of the species." The BLM (1987) described crucial habitat as follows: "*Crucial habitat* includes portions of the habitats of officially designated BLM sensitive species that if destroyed or adversely modified could result in their being listed as threatened or endangered pursuant to Section 4 of the Endangered Species Act of 1973, as amended."

Within the planning area, the CDCA Plan recognized two areas of tortoise crucial habitat: (a) Western Mojave Desert Crucial Habitat, which included most of the proposed Fremont-Kramer DWMA, the western portions of the Superior-Cronese and Ord-Rodman DWMAs, and the Desert Tortoise Research Natural Area; and (b) two small polygons located near the northern and central portions of the Johnson Valley Open Area (see Map 4, CDCA Plan).

BLM Category I, II, and III Habitat: In 1992, the BLM and CDFG adopted a *California Statewide Desert Tortoise Management Policy.* The crucial habitat designation was expressly dropped in 1992 in favor of BLM tortoise Category I, II, and III habitat areas (BLM and CDFG 1992). This policy included management goals for Category I, II, and III tortoise habitats, as follows: *Category I:* maintain stable, viable populations and increase populations where possible; *Category II:* maintain stable, viable populations; *Category III:* limit declines to the extent possible using mitigation measures. In April 1993, the BLM amended the CDCA plan to delineate these three categories of desert tortoise habitat on public lands (Map 1A, CDCA Plan, as amended, 1999).

The BLM's and CDFG's long-range goals for the management of desert tortoises in these three categories were given as follows (BLM and CDFG 1992): (a) Restore and maintain stable, viable tortoise populations within designated Category I and II habitats in the species' existing natural range in the California Desert; (b) Minimize impacts to tortoises in Category III Habitat through humane, low-level mitigation and compensation requirements; (c) Reduce non-natural mortality to the extent possible; (d) Prevent deterioration and promote restoration of Category I and Category II habitats; (e) Acquire private lands within Category I and Category II habitats through purchase or exchange and through compensation for habitat losses in Category I, II, and III habitats; (f) Maintain and increase populations through translocation of wild tortoises into suitable unoccupied or depleted habitats within the historic range; (g) Achieve interagency coordination and demonstrate commitment necessary to maintain viable tortoise populations in the California Desert; and, (h) Develop and implement a monitoring program to determine

progress toward meeting the overall management goal of maintaining viable tortoise populations in the California Desert.

USFWS Critical Habitat: Critical habitat is defined as (a) the specific areas within the geographical area occupied by the species at the time it is listed on which are found those physical or biological features which are essential to the conservation of the species and which may require special management considerations or protection; and (b) specific areas outside the geographic area occupied by the species at the time it is listed upon a determination by the Secretary of the Interior that such areas are essential for the conservation of the species (FESA Section 3(5)(A)). In 1994, the Service designated four critical habitat units in the planning area: Fremont-Kramer (518,000 acres), Superior-Cronese (766,900), Ord-Rodman (253,200), and Pinto Mountain (171,700) units (USFWS 1994a) (see Table 3-11)

Table 3-11
Desert Tortoise Critical Habitat

ENTITY	ACRES IN CRITICAL HABITAT	PERCENT OF CRITICAL HABITAT
Federal Government Department of the Interior		
National Park Service	27 mi^2	1%
Bureau of Land Management	1,533 mi^2	59%
Federal Government Department of Defense	305 mi^2	12%
State of California	51 mi^2	2%
Private	696 mi^2	26%
TOTAL	2,612 mi^2	100%

USFWS Recovery Units and Desert Wildlife Management Areas: The Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994b) established recovery goals and objectives for six "recovery units." The Western Mojave Recovery Unit is conterminous with the West Mojave planning area. The Recovery Plan stated that recovery units are "...essential to the long-term recovery, viability, and genetic diversity of the species." The Recovery Plan also recommended that Desert Wildlife Management Areas be established within each recovery unit. DWMAs were characterized as areas in which "...recovery actions will be implemented to provide for the long-term persistence of viable desert tortoise populations and the ecosystems upon which they depend."

The Recovery Plan recommended that DWMAs should: (a) be "...somewhere between 200 and 5,000 square miles..." with "...at least 1,000 square miles...recommended as the target size" (page 33); (b) have "...boundaries ... drawn to include the best examples of desert tortoise habitat in specific vegetation regions ... heterogeneous terrain, soil types, and vegetation within DWMAs will best provide protection for the entire ecosystem upon which healthy desert tortoise populations depend" (page 48); (c) contain "...the largest possible blocks of good tortoise habitat in an area, containing the most dense desert tortoise populations, should be included within DWMA boundaries" (page 48); and (d) consist of "...round or square patches of habitat are more

likely to retain desert tortoise populations than elliptical or rectangular ones. Long, linear strips are least desirable" (page 49).

The Recovery Plan suggested that at least three of four potential DWMAs be established within the Western Mojave Recovery Unit. These particular DWMAs were recommended for the following reasons (USFWS 1994b, page F28):

> The Western Mojave recovery unit is the largest and most heterogeneous of the recovery units in terms of climate, vegetation and topography. It includes three major vegetation types - the Western Mojave, Central Mojave, and Southern Mojave - each of which has significant and distinctive elements...Four DWMAs within the Western Mojave recovery unit represent the diversity. The Fremont-Kramer DWMA represents the Western Mojave region; the Superior-Cronese DWMA represents the Central Mojave region; and the Ord-Rodman DWMA represents the Southern Mojave region. The Joshua Tree DWMA [Pinto Mountain], the fourth within this recovery unit, contains Southern Mojave and Eastern Colorado elements. The tortoises have responded to this habitat heterogeneity with different food habits and behavior in each of these areas. *Thus, three DWMAs are essential in this recovery unit to preserve the heterogeneity* [emphasis added]. Secure, large reserves are especially critical because of the severe population declines and heavy human use in these areas.

It is important to note that the Recovery Plan is advisory; federal agencies are not required to adopt its suggestions. The Recovery Plan recommends the general areas where DWMAs should be located, but leaves the task of delineating the DWMA boundaries to the land management agencies, in coordination with USFWS, CDFG, local stakeholders, and other interested parties. The principle agency mechanism for implementing recovery plan tasks is through amendments to existing resource management plans (BLM) or through the development of broader bioregional plans in collaboration with local government.

Relationships Among Tortoise Habitat Designations: Public lands designated as *critical habitat* were generally the same as those earlier delineated by the CDCA Plan as *crucial habitat*, with the following exceptions. The northern half of Brisbane Valley, most of the Stoddard Valley Open Area, and two 50-square mile areas in Johnson Valley Open Area were considered crucial habitat but were not designated as critical habitat. Areas south of Fort Irwin and Edwards Air Force Base, and most of the area east of Highway 247, which are now critical habitat, were not identified as crucial habitat. Similarly, BLM lands designated as critical habitat generally corresponded to Category I and II tortoise habitats.

The Recovery Plan (USFWS 1994b, page 56) distinguished *DWMAs* and *critical habitat*, noting that critical habitat does not accomplish the same goals or have as dramatic an effect upon tortoise conservation as does a recovery plan because critical habitat does not apply management prescriptions to designated areas. However, designation of critical habitat does provide protection of desert tortoise habitat until such time as the Desert Tortoise Recovery Plan is implemented and DWMA management is employed.

Existing Areas of Relatively Higher Tortoise Densities: The preceeding discussion pertains to official designations by one or more of the federal or State agencies. Based on surveys between 1998 and 2002, regions were identified as having "above average" or "higher density" tortoise occurrence. Although not an official designation, the differentiation between

"higher density" and "lower density" tortoise areas is an important one relative to the plan's effectiveness of minimizing and mitigating take.

3.3.2.3 Tortoise Life History

The following life history information is taken from U.S. Fish and Wildlife Service (2002c). The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California, the desert tortoise occurs primarily within the creosote, shadscale, and Joshua tree series of Mojave Desert scrub, and the lower Colorado River Valley subdivision of Sonoran desert scrub. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 2 to 8 inches, diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but are occasionally found in windblown sand or in rocky terrain (Luckenbach 1982). Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of approximately 1,000 to 3,000 feet (Luckenbach 1982, Schamberger and Turner 1986).

Chambers Group (1994) has reported that, in the Alvord Slope area, tortoises were most common on low to moderate slopes of 0 to 10%. They were most abundant on valley floors, bajadas, and lower portions of hills. Preferred substrates included sand, gravel, and desert pavement in plains, washes, fans, and hills.

Adult desert tortoises are most active in California during the spring and early summer when annual plants are most common although juvenile tortoises have been observed outside burrows throughout the year, including December through January when adults are generally in a state of hibernation (Dave Morafka, pers. comm.). Additional adult activity occurs during warmer fall months and occasionally after summer rainstorms. Adult desert tortoises spend most of the remainder of the year in burrows, escaping the extreme conditions of the desert. Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley (1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Weinstein *et al.* (1987), and USFWS (1994b).

Tortoise activity is heavily influenced by the amount and timing of rainfall. Annual plants, which make up most of the tortoise's diet in the western Mojave Desert, vary depending on the timing of winter precipitation and the ensuing temperatures. Annual forbs, which are relatively more nutritionally balanced for tortoises, generally emerge following early winter rains with relatively warmer temperatures preceding and during the spring growing season. If winter rains do not come until late January or February, and temperatures are relatively cooler, native and non-native annual grasses will often emerge instead of native forbs. Such forage, particularly non-native grasses, offers little nutritional quality to tortoises.

Male tortoises may be more active during the fall, when their testosterone and viable sperm levels are higher than during the spring. Dr. Kristin Berry (pers. comm.) has shown that male sperm counts and viability are both relatively higher in the fall than in the spring of a given year. Data collected between 1998 and 2001, which were mostly restricted to the summer and fall periods (i.e., July through October), show that twice as many males were encountered in each of the three survey years as compared to females. Over the three-year period where gender could be determined, a total of 73 males and 35 females (2:1 ratio) were found, representing 26% and 13%, respectively, of the animals found (WMP data).

This was not observed during distance sampling, where surveys were performed in the spring. In 2001 and 2002, 87 males (40% of all animals where gender could be determined) and 69 (32%) females (1:1.26 ratio) were observed. Gender could not be determined for 60 tortoises, including 32 sexually immature animals. This probably indicates that males were somewhat more detectable than females in the summer and fall months when males are actively courting and mating with female tortoises, which is supported by numerous field observations.

Tortoises may be active throughout the year. Dr. David Morafka has shown that juvenile tortoises regularly emerge from burrows throughout the winter when conditions are favorable. Tortoises have recently been observed aboveground in early November west of California City (LaRue, pers. obs. 2002) and in late November at the DTNA (Michael Connor, pers. comm. 2001). Several were observed in early January 2003 in the Fremont Valley (Bob Parker, per. comm. 2003). Those animals may have opportunistically taken advantage of rain that fell in November and the early production of annual plants in January. Tortoises regularly emerge throughout the year at Edwards in response to several days of unseasonably warm temperature (Mark Hagan, pers. comm. 2003). These anecdotal accounts may represent a small fraction of adult animals in the population, and most animals may remain in their burrows through the winter.

Freilich et al. (2002) and Duda *et al.* (1999) have shown that tortoises are relatively more active in wetter years when compared to drier years. This observation is supported by distance sampling data collected in the Fremont-Kramer and Superior-Cronese DWMAs during the springs of 2001 (relatively wet year) and 2002 ("driest year in recorded history"). In the 2001, wet year, a total of 104 tortoises was encountered, including 29 (28%) in burrows and 75 (72%) in the open; in 2002, the dry year, of 112 tortoises observed, 57 (51%) were observed in burrows and 55 (49%) in the open. This indicates that about a quarter of the observed tortoises were in burrows in the wetter year, compared to about half of those observed in the dry year

Food resources for desert tortoises are dependent on the availability and nutritional quality of annual and perennial vegetation, which is greatly influenced by climatic factors, such as the timing and amount of rainfall, temperatures, and wind (Beatley 1969, 1974, Congdon 1989, Karasov 1989, Polis 1991 in Avery 1998). In the Mojave Desert, these climatic factors are typically highly variable; this variability can limit the desert tortoise's food resources.

Desert tortoises will eat many species of plants. However, at any time, most of their diet often consists of a few species (Nagy and Medica 1986, Jennings 1993 in Avery 1998). Additionally, their preferences can change during the course of a season (Avery 1998) and over

several seasons (Esque 1994 in Avery 1998). Possible reasons for desert tortoises to alter their preferences may include changes in nutrient concentrations in plant species, the availability of plants, and the nutrient requirements of individual animals (Avery 1998). In Avery's (1998) study in the Ivanpah Valley, desert tortoises consumed primarily green annual plants in spring; cacti and herbaceous perennials were eaten once the winter annuals began to disappear. Medica *et al.* (1982 in Avery 1998) found that desert tortoises ate increased amounts of green perennial grass when winter annuals were sparse or unavailable; Avery (1998) found that desert tortoises rarely ate perennial grasses.

Recent work by Dr. Olav Oftedahl, of the Smithsonian Institution, has shown that tortoises may selectively forage on plants that have a high Potassium Excretion Potential (PEP Index) (Oftedahl 1996). Tortoises do not have salt glands or other physiological means of getting rid of high levels of potassium, although they may rid their systems of potentially lethal levels of potassium by voiding their bladders. It is speculated that water loss during drought conditions could be lethal to tortoises voiding their bladders, unless additional rainfall becomes available shortly thereafter. Oftedahl's studies have shown that tortoises regulate potassium levels by selecting plants that are high in water content and protein (nitrogen), which he refers to as "High PEP plants." These plants are generally restricted to native, annual forbs such as desert dandelion (*Malacothrix glabrata*) and many legumes such as species in the *Astragalus* and *Lotus* genera. As such, most of the High PEP plants are restricted in their availability to the spring following a winter of sufficient rainfall. In some years, no such plants are available, and may result in imbalances in potassium and other elements, which in turn could result in water imbalance and other physiological stresses to tortoises.

Oftedahl (pers. comm., Nov. 2002) expressed his concern that pervasive land uses, such as cattle grazing, may have severely reduced or eliminated the seed bank and germination potential for High PEP annual plants. He suggested that removing cattle from grazing allotments might not be sufficient to support new growth of these essential plants if they have already been eliminated or replaced by non-native forb and grass species. There may be the need to reintroduce some of these species back into heavily impacted tortoise conservation areas.

Desert tortoises can produce from one to three clutches of eggs per year. On rare occasions, clutches can contain up to 15 eggs; most clutches contain 3 to 7 eggs. Multi-decade studies of the Blanding's turtle (*Emydoidea blandingii*), which, like the desert tortoise, is long lived and matures late, indicate that approximately 70 percent of the young animals must survive each year until they reach adult size; after this time, annual survivorship exceeds 90 percent (Congdon *et al.* 1993). Research has indicated that 50 to 60 percent of young desert tortoises typically survive from year to year, even in the first and most vulnerable year of life. We do not have sufficient information on the demography of the desert tortoise to determine whether this rate is sufficient to maintain viable populations; however, it does indicate that maintaining favorable habitat conditions for small desert tortoises is crucial for the continued viability of the species.

Desert tortoises typically hatch from late August through early October. At the time of hatching, the desert tortoise has a substantial yolk sac; the yolk can sustain them through the fall and winter months until forage is available in the late winter or early spring. However, neonates

will eat if food is available to them at the time of hatching; when food is available, they can reduce their reliance on the yolk sac to conserve this source of nutrition. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter, which are often shallowly excavated and run parallel to the surface of the ground.

Neonate desert tortoises emerge from their winter burrows as early as late January to take advantage of freshly germinating annual plants; if appropriate temperatures and rainfall are present, at least some plants will continue to germinate later in the spring. Freshly germinating plants and plant species that remain small throughout their phenological development are important to neonate desert tortoises because their size prohibits access to taller plants. As plants grow taller during the spring, some species become inaccessible to small desert tortoises.

Neonate and juvenile desert tortoises require approximately 12 to 16 percent protein content in their diet for proper growth. Desert tortoises, both juveniles and adults, seem to selectively forage for particular species of plants with favorable ratios of water, nitrogen (protein), and potassium. The potassium excretion potential model (Oftedal 2001) predicts that, at favorable ratios, consumption of plants with water and nitrogen allows desert tortoises to excrete high concentrations of potentially toxic potassium, which is abundant in many desert plants. Oftedal (2001) also reports that variation in rainfall and temperatures cause the potassium excretion potential index to change annually and during the course of a plant's growing season. Therefore, the changing nutritive quality of plants, combined with their increase in size, further limits the forage available to small desert tortoises to sustain their survival and growth.

In summary, the ecological requirements and behavior of neonate and juvenile desert tortoises are substantially different than those of sub-adults and adults. Smaller desert tortoises use abandoned rodent burrows, which are typically more fragile than the larger ones constructed by adults. They are active earlier in the season. Finally, small desert tortoises rely on smaller annual plants with greater protein content to be able to gain access to food and to grow.

3.3.2.4 Tortoise Populations

Tortoise population changes may be detectable using information gathered from BLM permanent study plots, distance sampling surveys and sign count surveys. Current data can be compared with older data to see, in general, if there have been declines or increases in abundance of tortoises or their sign. Population changes can also be detected through carcass observations. This section addresses (1) permanent tortoise study plots, (2) desert tortoise field surveys, and (3) desert tortoise distribution.

3.3.2.4.1 Permanent Study Plots

Table 3-12 summarizes Dr. Kristin Berry's tortoise density estimates (for adults only at the 95% confidence interval, with associated ranges) for the nine permanent study plots found in the West Mojave planning area between 1979 and 1996. Estimates are for the years that mark-recapture studies were performed (source: 1996 memorandum from Dr. Berry to BLM then-

Assistant District Manager Molly Brady)[3].

Table 3-12
Tortoise Density Estimates at Five Study Plots in the West Mojave.

STUDY PLOT	YEAR SURVEYED	ESTIMATED DENSITIES OF ADULT TORTOISES	RANGE
Fremont Valley	1981	116	(89-152)
	1987	78	(47-127)
	1991	33	(12-85)
DTNA Interior	1979	154	(117-202)
	1982	238	(184-308)
	1988	157	(121-204)
	1992	15	(5-39)
	1996	13	(5-33)
DTNA Interpretive Center - Inside	1979	181	(151-218)
	1985	179	(155-206)
	1989	81	(62-107)
	1993	47	(26-86)
DTNA Interpretive Center - Outside	1979	137	(106-178)
	1985	105	(82-134)
	1989	50	(32-78)
	1993	22	(14-38)
Fremont Peak	1989	70	(23-209)
	1985	38	(23-64)
	1989	27	(14-50)
	1993	5	(2-15)
Kramer Hills	1980	109	(78-153)
	1982	114	(85-152)
	1987	67	(43-103)
	1991	44	(26-75)
	1995	34	(19-61)
Stoddard Valley	1981	94	(58-125)
	1987	124	(89-172)
	1991	81	(57-116)
Lucerne Valley	1989	44	(66-132)
	1989	75	(53-107)
	1990	64	(43-95)
	1994	65	(45-95)
Johnson Valley	1980	69	(41-115)
	1986	49	(13-183)
	1990	15	(6-39)
	1994	16	(8-32)

3 Data from study plot surveys since 1996 at the DTNA and Fremont Valley by the Desert Tortoise Preserve Committee are currently unavailable. In her presentation at the Desert Tortoise Disease Workshop at Zzyzx in mid-November 2002, Dr. Berry presented additional data indicating additional declines on these study plots, although the magnitude of these declines remains unknown.

Using Dr. Berry's same data, Table 3-13 shows the percent declines observed at each of the study plots, the dates of the first and last surveys, and the elapsed time between the surveys (in parenthesis). Study plots are shown in descending order of observed tortoise decline, with the highest declines shown at the top and the lowest at the bottom.

Table 3-13
Percent Declines in Tortoise Numbers at Nine Permanent Study Plots in the West Mojave Planning Area, 1979 - 1996

STUDY PLOT	FIRST - LAST SURVEY DATES (ELAPSED YEARS)	PERCENT DECREASE
Fremont Peak	1980 - 1993 (13)	93%
DTNA Interior	1979 - 1996 (17)	91%
DTNA IC Outside	1979 - 1993 (14)	84%
Johnson Valley	1980 - 1994 (14)	77%
DTNA IC Inside	1979 - 1993 (14)	74%
Fremont Valley	1981 - 1991 (10)	72%
Kramer Hills	1980 - 1995 (15)	34%
Lucerne Valley	1980 - 1994 (14)	30%
Stoddard Valley	1981 - 1991 (10)	5%

These data indicate that tortoise declines have ranged from as much as 93% at the Fremont Peak study plot to as little as 5% at the Stoddard Valley study plot. In the past, there has been some criticism of extrapolating declines found at the study plots to surrounding areas. Tortoise sign count surveys conducted between 1998 and 2002 for the West Mojave Plan, however, have demonstrated that these regional declines indeed have occurred, and are not restricted to the permanent study plots. Moreover, the pattern of decline recorded at Dr. Berry's study plots mirrors the findings of the regional field surveys. Above average tortoise sign counts occur in regions that encompass the three plots where declines were least severe (Kramer Hills, Lucerne Valley, and Stoddard Valley). The plots where tortoise declines were between 93% and 72% (Fremont Peak down to Fremont Valley) occurred outside the above-average tortoise sign count polygons.

3.3.2.4.2 Desert Tortoise Field Surveys

Many types of focused desert tortoise surveys have been conducted:

- Since 1990, "presence-absence" surveys have been required by cities and counties to determine if tortoises would be adversely affected by a proposed project or land use.

- Since 1990, "clearance" surveys have been authorized under Section 7 and Section 10(a)(1)(B) of FESA to remove tortoises from harm's way during otherwise lawful activities.

- During 2001 and 2002, "distance sampling" surveys have been completed throughout the four proposed DWMAs, which are intended, over a relatively long period of time (i.e., 30 years), to estimate tortoise densities and population trends at the DWMA level.

- Since 1975, federal land managers (BLM and the military bases) have used "tortoise sign count" surveys to determine relative tortoise abundance and distribution over regional landscapes.

Desert Tortoise Presence-Absence Surveys (1990 - 2002): Since the tortoise was listed as threatened in 1990, city and county planning departments have required focused tortoise surveys on undeveloped lands as per USFWS (1992) protocol. Such sites have been surveyed along transects spaced at 30-foot intervals, which is intended to result in 100 percent coverage of the site and a determination of presence or absence of tortoises.

In 1998, about 250 consultant's reports for presence-absence tortoise surveys were obtained from San Bernardino County. Of these, 234 reported either presence or absence of tortoise sign. An additional 595 presence-absence surveys associated with specific projects in San Bernardino County and elsewhere were obtained in 2002 by the planning team, have been digitized for GIS analysis, and are used in this analysis.

There have been at least five other, recent programmatic surveys or summaries of previous surveys for tortoise occurrence within urban areas: (1) 225 square miles in Lancaster (Tierra Madre Consultants, Inc. 1991); (2) 200 square miles encompassing portions of Adelanto, Apple Valley, Hesperia, and Victorville (Tierra Madre Consultants, Inc. 1992); (3) 100 square miles in Palmdale (Feldmuth and Clements 1990); (4) 38 square miles in Ridgecrest and Inyokern (Circle Mountain Biological Consultants 1997); and (5) 38 square miles in Yucca Valley (Tierra Madre Consultants, Inc. 1993).

Distance Sampling Surveys in the West Mojave Planning Area (2001 – 2002): Unlike the presence-absence surveys discussed above and sign count surveys discussed below, distance sampling surveys are intended to look only for animals. Carcass information is also collected, but is not used to determine tortoise densities. These data are collected in the spring when adult tortoises are most likely to be active, depending on climatic factors, particularly rainfall. They provide an independent look at tortoises during the spring (which can be compared to the summer-fall observations of tortoises that were incidentally observed during sign count surveys).

Using information collected during the 2001 survey, "encounter rates" were determined for each of the four proposed DWMAs. An encounter rate of 0.15 tortoises/kilometer indicates that the surveyors, on average, had to walk about 10 kilometers (about 6 miles) to see a tortoise. Encounter rates for the four DWMAs follow: 0.178 in the Ord-Rodman, 0.156 in Pinto Mountain, 0.145 in the Fremont-Kramer, and 0.115 in the Superior-Cronese. Higher encounter rates indicate that tortoises are seen relatively more often for the same unit area surveyed.

Encounter rates are only a small part of determining tortoise densities. Although densities were calculated for the 2001 distance sampling effort, they have wide-ranging "coefficients of variation," which indicates that the estimates are very rough. For example, the number of tortoises per square kilometer was determined to be 11.66 for the Ord-Rodman, 10.31 for the Pinto Mountain, and 9.58 for the Fremont-Kramer and 7.59 for the Superior-Cronese DWMAs (source: Memo distributed at MOG TAC meeting in about June 2001). The corresponding coefficients of variation were 14.46, 26.69, 15.38, and 18.21, respectively. For

Pinto Mountain, with the highest coefficient of variation (26.69), the density estimate of 10.31 tortoises/km^2 has a possible range of 6.12 to 17.38 tortoises/km^2. The variation becomes important when one considers the large size of the regions involved.

The high degree of variation is primarily due to small sample size, in this case, one year. As such, it is too soon to interpret the distance sampling data for the West Mojave, as the density estimates derived from one year are far too variable. Relatively accurate density estimates may not be available until completion of the fifth consecutive year[4].

Desert Tortoise Sign Count Surveys (1975 - 2002): Unlike the study plot (mark-recapture) and distance sampling methodologies, sign count surveys are focused on tortoise scat and burrows rather than animals. Dr. Berry coordinated most of the earliest surveys in the mid-1970s until the late 1980s; LaRue coordinated the same-method surveys between 1998 and 2002[5].

Between about 1988 and 1998, most sign count surveys were performed on military installations. BLM public lands had not been surveyed for nearly 20 years. The most recent BLM sign count surveys had been conducted between 1975 and 1982 when 1,678 transects were surveyed within the CDCA, including 894 transects within the West Mojave planning area (see BLM 1999). In 1990 a BLM survey was conducted over a 150 square mile area at a density of three transects per square mile, throughout the DTNA, Fremont Valley, and Spangler Hills (including portions of the BLM Open Area).

The maps published in Berry and Nicholson (1984) were the most recent geographic portrayal of tortoise densities and distribution on public lands outside installations, until 1998, when new sign count surveys were conducted (Map 3-6). However, the 1984 range map (Map 3-7) was based, in part, on the early BLM surveys, and there have been documented declines in tortoise numbers in much of the West Mojave since the data were collected (Berry 1990, as amended; Corn 1994).

The data were used to identify only the relative abundance of tortoises (as judged by high versus low sign counts) and general distribution, given the imprecision inherent in using sign count data to determine tortoise densities (see Appendix L), rather than precise tortoise numbers. The results presented throughout this analysis equate each transect with one square mile (i.e.,

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4 In Washington County, Utah, in support of the Washington County HCP at the Red Cliffs Desert Reserve, Ann McLuckie has supervised distance sampling over a consecutive five-year period, from 1998-2002. Looking at any given year, the coefficient of variation for Zone 3, for example, ranged from 15.86 up to 18.16 (McLuckie *et al.* 2002). However when the data are combined over the four-year period, the pooled coefficient of variation was given as 7.34, which a little more than two times more accurate than the estimates given for any one year.

5 Methodologies used between 1975 and 2002 were essentially the same (Berry and Nicholson 1984), where one transect was surveyed along a 1.5-mile equilateral triangle on a given square mile. The focus of the surveys has always been tortoise sign (hence, "sign count" surveys), although incidental sightings of live animals and carcasses were also recorded. Observable human disturbances were also tallied along each sign count transect. Disturbance data collected since 1998 have included: vehicles (paved roads, dirt roads, trails, tracks), garbage, shooting (shooting areas, individual shell casings), mining (test pits, markers), campsites, sheep sign, cattle sign, domestic dog sign, fence lines and posts, utility lines, denuded habitat, partially denuded habitat, old buildings, and ordnance.

"52 mi^2 of higher density tortoise areas," "12 mi^2 of higher density vehicle-based impacts," etc.). Dr. Krzysik has calculated that each sign count transect is sufficient to survey about 1.3% of a given square mile. As such, data collected along transects are best used as an *index*, not an absolute census of the population or its characteristics. Data from any one or two transects would have very low predictive value for the square mile(s) being characterized.

However, importantly, on a regional scale when all transects are combined, distribution patterns and relative occurrences (i.e., "above" versus "below" average concentrations) of tortoises are revealed. And even more importantly, they are corroborated by distance sampling data, and are consistent with trends reported on Dr. Berry's study plots.

Sign count survey data were used to: (a) refine proposed DWMA boundaries (e.g., determine whether DWMA status was appropriate for the Iron Mountains, an area outside of critical habitat and north of Helendale/Silver Lakes where surveys identified significant amounts of tortoise sign); (b) determine the best places to close routes to minimize impacts in areas where tortoises most likely occur; and (c) determine alternative DWMA boundaries and compare EIR/S alternatives.

Sign count surveys conducted since 1988 (see Map 3-6) provide the most recent, available data on the distribution of tortoise sign, which Dr. Anthony Krzysik (2002a, b, c) has show to be positively correlated to incidence of tortoises. Over 8,100 transects have been surveyed on more that 6,300 square miles within the West Mojave planning area. These survey efforts are summarized in Appendix L

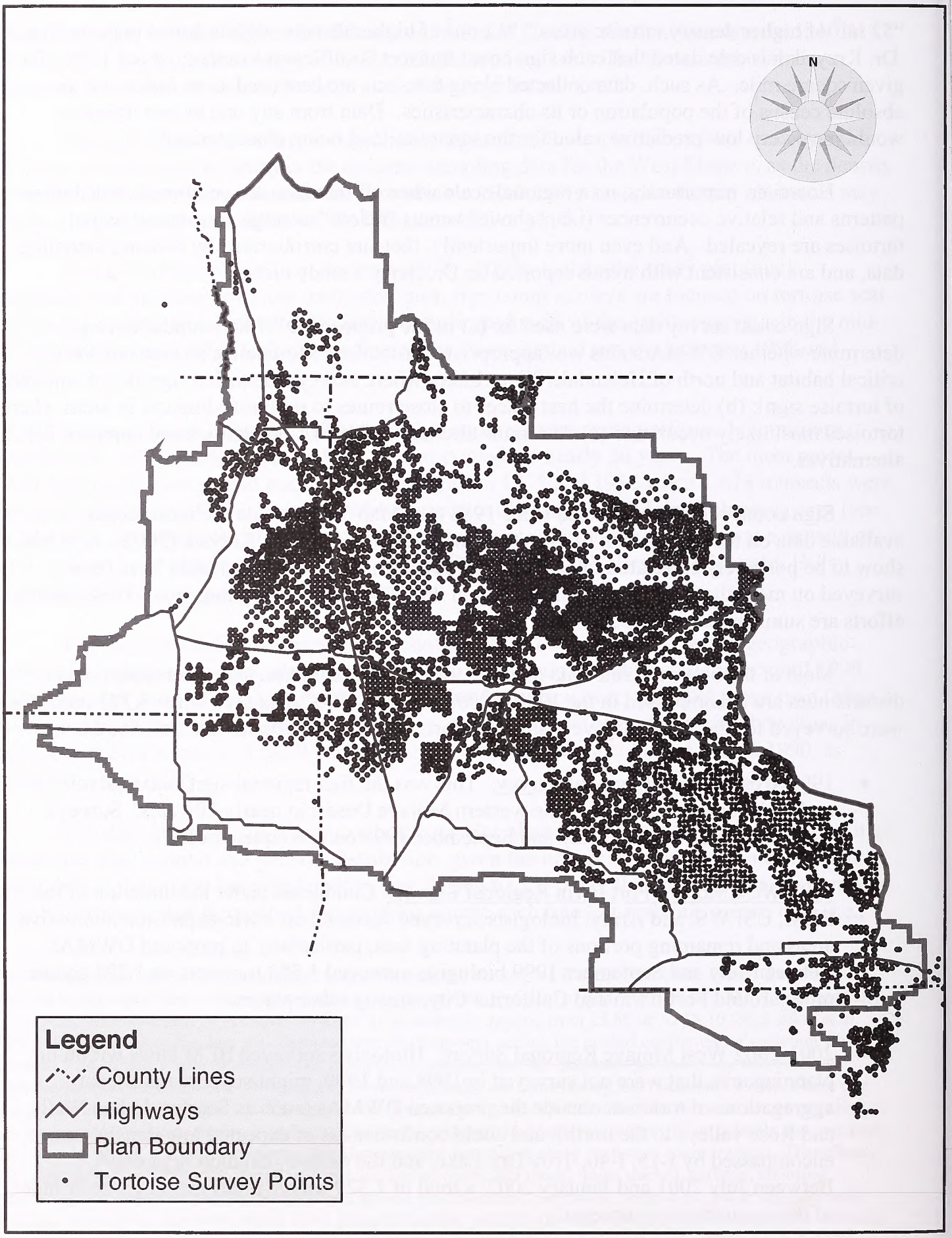
Most of the best available data on current tortoise distribution and observable human disturbances are encompassed in the 1998, 1999, and 2001-2002 data sets, when 3,372 transects were surveyed for the West Mojave planning effort. Relevant information is described below:

- 1998 West Mojave Regional Survey: This was the first regional sign count survey undertaken on BLM lands in the western Mojave Desert in nearly 20 years. Surveys were completed between July and September 1998 on 856 square miles.

- 1999 West Mojave-Fort Irwin Regional Survey: Conducted under the direction of the BLM, USFWS, and Army, biologists surveyed various Fort Irwin expansion alternative areas and remaining portions of the planning area, particularly in proposed DWMAs. Between July and September 1999 biologists surveyed 1,553 transects on 1,291 square miles around Fort Irwin and California City, among other places.

- 2001-2002 West Mojave Regional Survey: Biologists surveyed BLM lands within the planning area that were not surveyed in 1998 and 1999, might support significant aggregations of tortoises outside the proposed DWMAs (such as Searles, Indian Wells, and Rose valleys to the north), and could confirm areas of expected low-density (area encompassed by I-15, I-40, Troy Dry Lake, and the eastern planning boundary). Between July 2001 and January 2002, a total of 1,329 square miles meeting one or more of these criteria was surveyed.

Tortoise Sign Count Surveys Since 1988

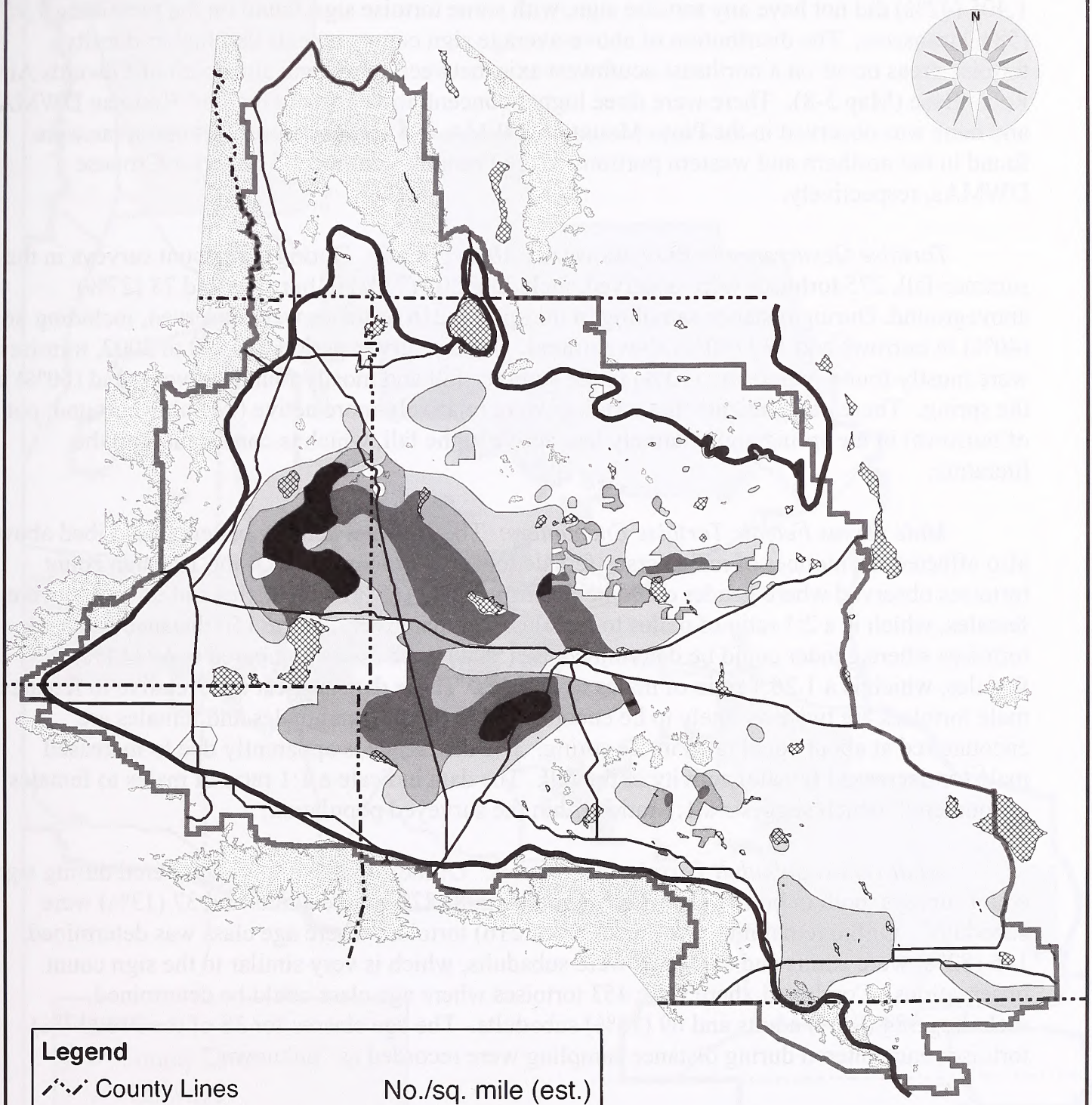


West Mojave Plan FEIR/S
Map 3-6

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

1984 Tortoise Range and Density Map



10/15/04

West Mojave Plan FEIR/S
Map 3-7

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

1998 –2001 Survey Results: During the three years 3,362 transects covering 3,378 mi^2 were surveyed, typically at a density of one transect per square mile. Of the 3,362 transects, 1,405 (42%) did not have any tortoise sign, with some tortoise sign found on the remaining 1,957 (58%) transects. The distribution of above-average sign counts reveals that higher density tortoise areas occur on a northeast-southwest axis, between Fort Irwin and south of Edwards Air Force Base (Map 3-8). There were three higher concentration areas in the Ord-Rodman DWMA, and none was observed in the Pinto Mountain DWMA. No higher density tortoise areas were found in the northern and western portions of the Fremont-Kramer and Superior-Cronese DWMAs, respectively.

Tortoise Occurrence in Burrows versus Aboveground: During sign count surveys in the summer-fall, 275 tortoises were observed, including 202 (73%) in burrows and 73 (27%) aboveground. During distance sampling in the spring, 216 tortoises were observed, including 86 (40%) in burrows and 130 (60%) aboveground. For the survey period of 1998 to 2002, tortoises were mostly found in burrows (73%) in the summer-fall and mostly found aboveground (60%) in the spring. These data indicate that tortoises were relatively more active (i.e., aboveground, out of burrows) in the spring and relatively less active in the fall, which is consistent with the literature.

Male versus Female Tortoise Encounters: The seasonal activity patterns described above also affected the number of male versus female tortoises encountered. Of the 108 sign count tortoises observed where gender could be determined, 73 (68%) were males and 35 (32%) were females, which is a 2:1 ratio of males to females. Comparatively, of the 156 distance-sampling tortoises where gender could be determined, 87 (56%) were males compared to 69 (44%) females, which is a 1.26:1 ratio of males to females. These data suggest that, relative to females, male tortoises are twice as likely to be encountered in the fall, and males and females are encountered at about equal rates in the spring. The difference is apparently due to increased male (or decreased female) activity in the fall. The data indicate a 1:1 ratio of males to females encountered, which suggests a 1:1 ratio within the surveyed population.

Adult versus Subadult Tortoise Encounters: Of the 275 tortoises encountered during sign count surveys, both in burrows and aboveground, 238 (87%) were adults and 37 (13%) were subadults[6]. Of the remaining 178 (i.e., 83% of 216) tortoises where age class was determined, 146 (82%) were adults and 32 (18%) were subadults, which is very similar to the sign count observations. Combined, there were 453 tortoises where age class could be determined, including 384 (85%) adults and 69 (15%) subadults. The age classes for 38 of the 216 (17%) tortoises encountered during distance sampling were recorded as "unknown."

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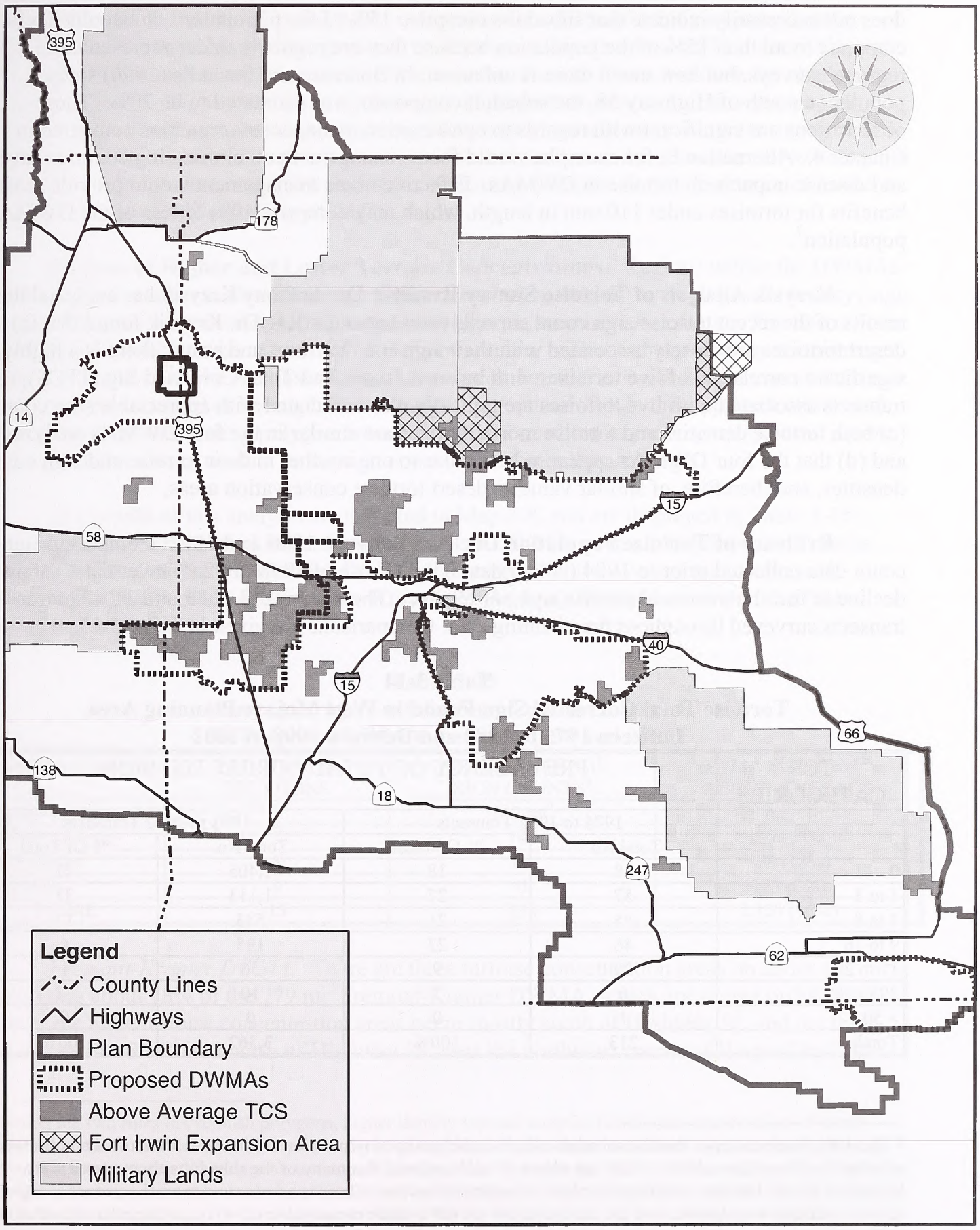
6 Surveyors used a cutoff of 180 mm to determine age class; carapace lengths of less than 180 mm characterized subadults, and adults were 180 mm or greater in length. Although age class determinations were affected by seasonal activity of tortoises, age class was also determined from burrow widths. In general, the width of a tortoise burrow opening is equal to the length of the tortoise constructing the burrow. As such, the age class for tortoises in burrows could be ascertained by measuring the width of the burrow opening. However, it is well documented that subadult tortoises are notoriously difficult to find, and generally under-represented in regional surveys.

Higher Density Tortoise Sign Count Areas (1998-2002)



West Mojave Plan FEIR/S
Map 3-8

Scale: 1 : 1,300,000

0 10 20 30 Km

0 10 20 30 Miles

7/29/04

Although these data indicate subadults comprised about 15% of the tortoise encounters, it does not necessarily indicate that subadults comprise 15% of the population. Subadults likely comprise more than 15% of the population because they are regularly under-represented in regional surveys, but how much more is unknown. In Boarman and Sazaki's (1996) study population south of Highway 58, the subadult component was estimated to be 20%. These observations are significant with regards to conservation management scenarios compared in Chapter 4. Alternative E, for example, would focus management on eliminating common ravens and disease impacts on tortoise in DWMAs. Effective raven management would provide most benefits for tortoises under 110 mm in length, which may comprise 10% or less of the DWMA population[7].

Krzysik Analysis of Tortoise Survey Results: Dr. Anthony Krzysik has analyzed the results of the recent tortoise sign count surveys (see Appendix K). Dr. Krzysik found that (a) desert tortoises are closely associated with their sign (i.e., burrows and scats); there is a highly significant correlation of live tortoises with burrows, scats, and Total Corrected Sign (TCS); (b) transects associated with live tortoises are typically also associated with appreciable sign counts; (c) both tortoise densities and tortoise mortality rates are similar in the four DWMAs analyzed; and (d) that the four DWMAs appear to be similar to one another in their tortoise and sign count densities, and therefore, of similar value as desert tortoise conservation areas.

Evidence of Tortoise Population Declines Between 1980 and 2002: Comparing sign count data collected prior to 1984 ("older data") with those of 1998-2002 ("newer data") shows a decline in the abundance of tortoise sign per transect. There were 213 older and 3,362 newer transects surveyed throughout the planning area. Comparisons are given in Table 3-14.

Table 3-14
Tortoise Total Corrected Sign Found in West Mojave Planning Area
Between 1975 to 1982 and Between 1998 to 2002

TCS CATEGORIES	PREVALENCE OF TOTAL CORRECTED SIGN			
	1975 to 1982 Transects		1998 to 2002 Transects	
	Total No.	% Of Total	Total No.	% Of Total
0	38	18	1,405	42
1 to 3	57	27	1,113	33
4 to 8	38	21	583	17
9 to 16	46	22	195	6
17 to 28	21	9	56	1
29 to 50	6	3	10	<1
> 50	1	0	0	0
Totals	213	100%	3,362	100%

7 The 10% figure assumes that the subadult cohort in the surveyed population is 20% (i.e. 5% more than observed to account for lower detectability of this age class). It also assumes that many of the subadults encountered were between 120 and 180 mm, and therefore less vulnerable to ravens. There is no way to census (i.e., count every animal) subadult populations, and the data generally do not include measured lengths (i.e., more often recorded as "subadult" than measured), so these numbers are hypothetical.

When data for the three lowest sign count categories (i.e., 0 to 8) are combined, a total of 140 older transects (66% of 213) and 3,101 newer transects (92% of 3,362) were included. When data for the three highest categories (9 to 50) are combined, a total of 73 older (34%) and 261 newer (8%) transects were included. One sees that there has been a shift in the abundance of observed tortoise sign, with relatively few sign on proportionately more transects recently surveyed, corresponding to relatively more sign on proportionately more transects surveyed 20 years ago. In other words, there has been a proportional decline in the abundance of *tortoise sign* observed on transects between 1980 and 2002, indicating a decline in the abundance of *tortoises* between 1980 and 2002 (see Krzysik 2002a, b, c).

Regions of Higher and Lower Tortoise Concentrations: Regions within the DWMAs were identified relative to above average (higher density) and below average (lower density) sign counts. Polygons were established to encompass all areas meeting two criteria. The two criteria included: (1) There must be at least four contiguous square miles of above-average tortoise sign before a polygon could be established; and, (2) polygon boundaries must not span more than one linear mile not surveyed or having below-average sign counts. While this approach eliminated subjectivity from delineating polygon boundaries, it also resulted in encompassing some square miles where there were no data or the sign counts were lower than average.

The results of this analysis are depicted in Map 3-8, and are displayed in Table 3-15. Three regions were identified in the Fremont-Kramer DWMA, seven in the Superior-Cronese DWMA, and five in the Ord-Rodman DWMA that support above-average occurrences of tortoise sign (and therefore tortoises; see Krzysik 2002a, b, c). None was found in the Pinto Mountain DWMA.

Table 3-15
Above-Average Tortoise Sign Counts Observed
In Proposed DWMAs between 1998 and 2001

PROPOSED DWMA	NUMBER OF POLYGONS	ABOVE-AVERAGE SIGN COUNTS[8]	DWMA SIZE AND % ABOVE-AVERAGE
Fremont-Kramer	3	142 mi^2	779 mi^2 (18%)
Superior-Cronese	7	147	980 (15%)
Ord-Rodman	5	69	388 (18%)
Pinto Mtn.	0	0	173 (0%)
TOTAL	15	258	2,320 (15%)

Fremont-Kramer DWMA: There are three tortoise concentration areas on about 142 mi^2, comprising about 18% of the 779 mi^2 Fremont-Kramer DWMA, which are shown on Map 3-8. Two of the three tortoise concentration areas occur mostly south of Highway 58, and the third one occurs in a 9 mi^2 area north of Highway 58, near the northwest corner of Harper Dry Lake.

[8] In using the two rules to establish polygons, higher density tortoise areas included some square miles of lower densities and those that were not surveyed, as depicted on Map 3-7. However, only those square miles supporting higher sign counts within the polygons are included in the tallies shown in the table. "Above-average" or "higher density" areas were derived by excluding all transects with no sign and determining the average of the remaining values. In this comparison, only transects surveyed in DWMAs are included. As such, "above-average" transects/square miles are actually "average and above" transects found in DWMAs.

Importantly, no higher density polygons were found at the Desert Tortoise Natural Area and Fremont Valley, where tortoise densities in the early 1980's were 181-238 tortoises/mi^2 at the DTNA and 116 tortoises/mi^2 in the Fremont Valley. No higher density areas were found in the regions where Dr. Berry reported declines up to 90% on the associated study plots. Although tortoises certainly occur in areas north of Highway 58, it appears that many animals have died throughout the region since the late 1970's, a conclusion supported by the carcass data, described below.

Superior-Cronese DWMA: There are seven tortoise concentration areas on about 147 mi^2, comprising about 15% of the 980 mi^2 Superior-Cronese DWMA, which are shown on Map 3-8. The core area occurs north of Barstow and Hinkley, east of Harper Lake, and west of Irwin Road, in the Mud Hills-Water Valley area. Other concentrations are found in "Coyote Corner," which is southwest of Fort Irwin, and in the Cronese Lakes area, southeast of Fort Irwin. All, or a portion of, three higher density areas comprising 17 mi^2, are found in the Fort Irwin expansion area. There were also 34 mi^2 of higher density areas on Fort Irwin south of the UTM 9-0 line and adjacent areas, mostly to the northwest. The Fort Irwin expansion, then, would affect about 51 mi^2 of all higher tortoise areas. No higher concentration areas were observed north of Harper Lake to China Lake or in the western portions of Superior Valley. Some of these areas correspond to recent die-off regions, where numerous recently dead tortoises have been found (see discussion below).

Ord-Rodman DWMA: There are five tortoise concentration areas on about 69 mi^2, comprising about 18% of the 388 mi^2 Ord-Rodman DWMA, which are shown on Map 3-8. These concentration areas are included in three general regions: (1) northern portion of Stoddard Valley along Lenwood Wash, extending north over Daggett Ridge to near Barstow; (2) northern Lucerne Valley; and (3) in the northwest corner of the DWMA, north of the Johnson Valley Open Area and east of Box Canyon, bordering the Twentynine Palms Marine Corps Base. The Ord Mountains physically separate these three subregions, so that the absence of sign through the middle part of the DWMA may be due to natural causes (i.e., fewer tortoises in elevations above 4,500 feet), or may not have been surveyed. Relatively less tortoise sign was found in Stoddard Valley east of Highway 247, where Dr. Berry's 1984 range map showed that concentrations were at one time in excess of 250 tortoises/mi^2 (Map 3-7).

It is noteworthy that two of the nine BLM permanent study plots occur in the Ord-Rodman DWMA, both in areas of relatively higher density sign counts. The Lucerne Valley plot is located in the northern Lucerne Valley, in the southern tortoise concentration area, and the Stoddard Valley plot is located west of Daggett Ridge, in the northwestern concentration area. Dr. Berry's studies found a 30% decline on the Lucerne Valley plot and a 5% decline on the Stoddard Valley plot, which is relatively small compared to declines in excess of 75% in the northern and northwestern Fremont-Kramer DWMA.

Pinto Mountain DWMA: There were no above-average tortoise areas in the 173 mi^2 Pinto Mountain DWMA. Population densities appeared to be low, although few carcasses were found during sign count surveys performed since 1998. There also appeared to be no older or more recent die-off regions within this area.

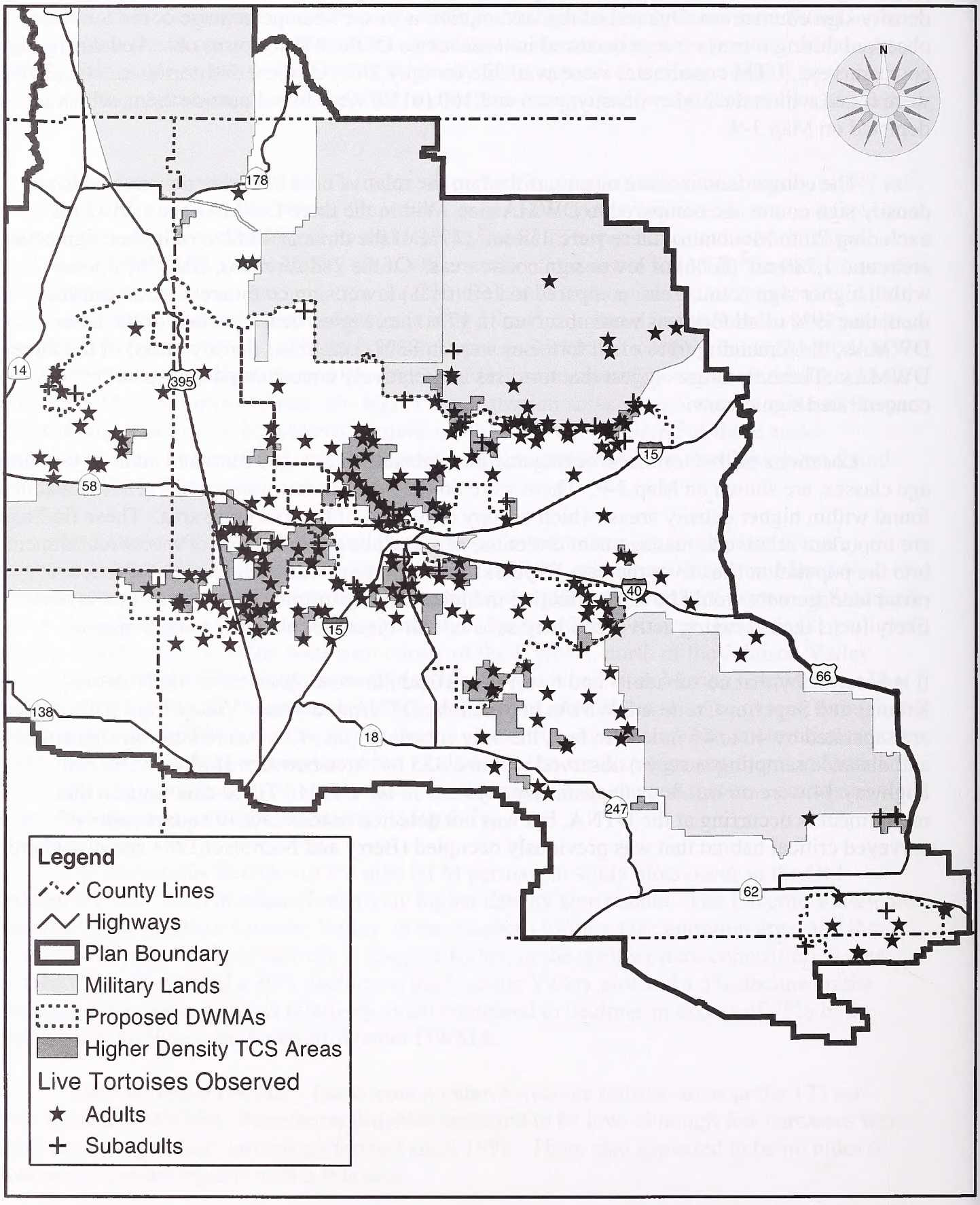
Occurrence of Tortoises Relative to Higher Density Sign Count Areas: Much of the preceding discussion relies on the assumption that relatively more tortoises are found in higher density sign count areas. One test of this assumption is to see what percentage of the tortoises observed during recent surveys occurred in these areas. Of the 275 tortoises observed during sign count surveys, UTM coordinates were available for only 261. Of these 261 tortoises, 101 (39%) were found within the higher density areas and 160 (61%) were found outside them, which is depicted on Map 3-9.

The comparison is more meaningful when the relative area of higher density and lower density sign counts are compared to DWMA size. Within the three DWMAs (i.e., 2,147 mi^2 excluding Pinto Mountain), there were 358 mi^2 (17% of the three DWMAs) of higher sign count areas and 1,789 mi^2 (83%) of lower sign count areas. Of the 261 tortoises, 101 (39%) were within higher sign count areas, compared to 160 (61%) lower sign count areas. One can see, then, that 39% of all tortoises were observed in 17% (i.e., higher density areas) of the three DWMAs; the remaining 61% of all tortoises were in 83% (i.e., lower density areas) of the three DWMAs. These findings suggest that tortoises are relatively concentrated in areas of concentrated sign counts.

Locations of live tortoises, segregated into subadult (i.e., <180 mm) and adult (≥180 mm) age classes, are shown on Map 3-9. There were 86 (85%) adult tortoises and 15 (15%) subadults found within higher density areas, which occupy only 17% of the planning area. These findings are important relative to management direction, as subadults are indicative of recent recruitment into the population (i.e., over the past 10 years), and represent future generations. Proactive raven management would be most effective in higher density tortoise areas, given that ravens likely focus their foraging activities where subadult tortoises are relatively more common.

It is noteworthy that no subadults and fewer than 10 adults were observed in the Fremont-Kramer and Superior-Cronese DWMAs between the DTNA and Water Valley/Mud Hills, which are separated by 40 to 45 miles. In fact, the only subadults (i.e., 13 observed during sign count and distance sampling surveys) observed within a 325 mi^2 area between Highway 395 and Highway 14 were *all inside or immediately adjacent to the DTNA*. These data suggest that recruitment is occurring at the DTNA, but was not detected in hundreds of square miles of surveyed critical habitat that was previously occupied (Berry and Nicholson1984 and elsewhere).

Distribution of Live Tortoises Observed Relative to Higher Density Sign Count Areas



West Mojave Plan FEIR/S
Map 3-9

Scale: 1 : 1,350,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Regional Declines in the Four DWMAs: In comparing the earliest survey efforts with later ones, it appears that there have been substantial declines in tortoise numbers in the northwest portion of the Fremont-Kramer DWMA. This area is bounded by Highway 58 to the south, Red Mountain to the north, Fremont Peak to the east, and the DTNA to the west. It encompasses the three DTNA study plots and those at Fremont Peak and Fremont Valley, where Dr. Berry documented tortoise declines ranging from 93% at Fremont Peak to 72% at the Fremont Valley study plot. No above-average tortoise sign polygons were identified anywhere within this region. Although there were a few transects with above-average tortoise sign, these were insufficiently concentrated for the polygon criteria to be met.

The analysis found above-average tortoise sign polygons to be oriented on a northeast-to-southwest axis, from about Fort Irwin to the northeast to areas south-southeast of Edwards Air Force Base (Map 3-8) in areas identified as having above-average tortoise sign; the Johnson Valley plot is east of this area. It is noteworthy that the Kramer Hills, Lucerne Valley, and Stoddard Valley study plots showed the smallest population declines during the 10 to 15 years they were surveyed (1996 Berry Memorandum), and are included in three regions that currently support higher sign count areas.

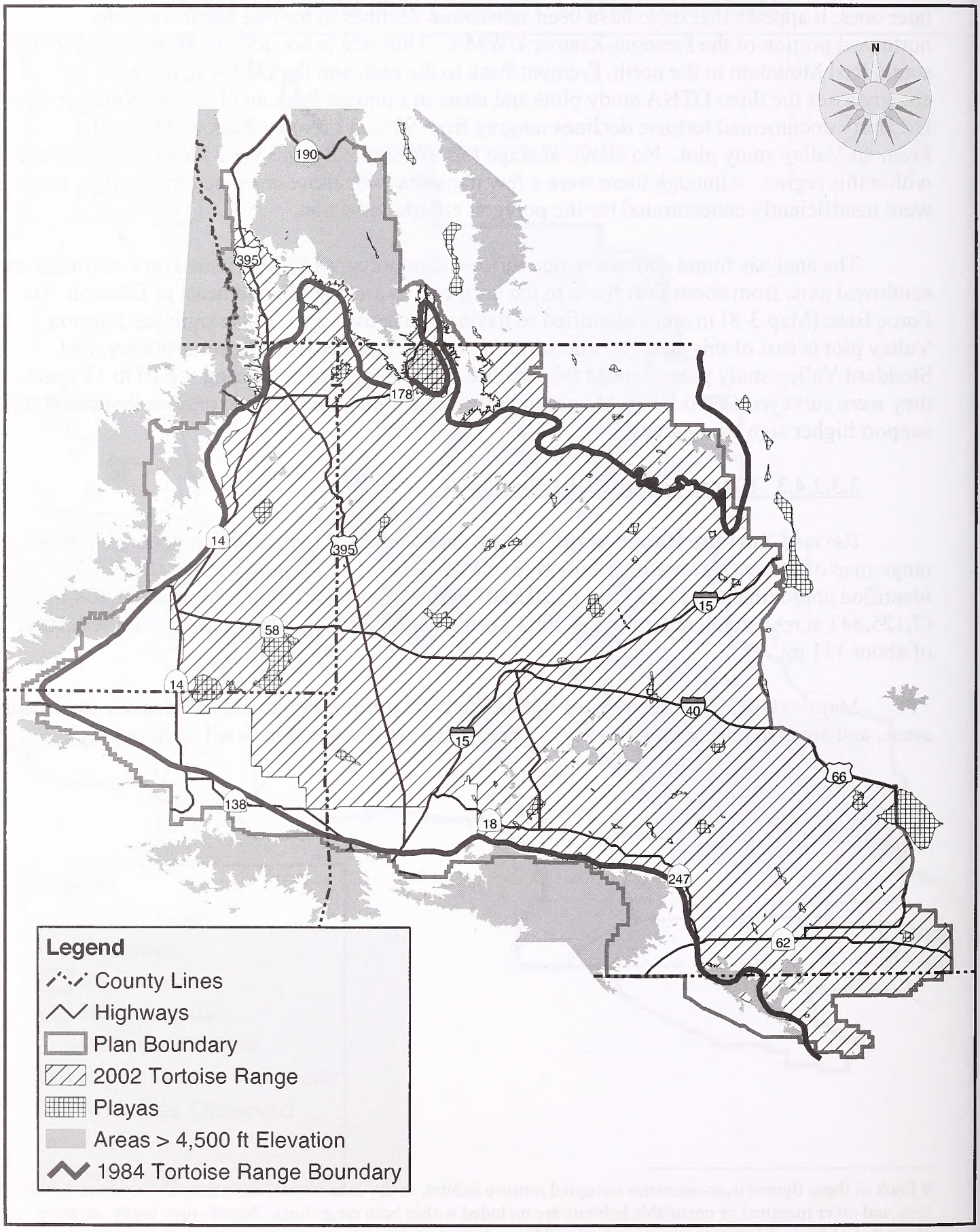
3.3.2.4.3 Desert Tortoise Distribution

Revised Tortoise Range Map: Survey data were used to produce an updated tortoise range map of current tortoise distribution (See Map 3-10). The 1984 range map (Map 3-7) identified approximately 11,255 mi^2 (7,203,107 acres) of tortoise habitat, whereas 11,134 mi^2 (7,125,842 acres) are identified in the 2002 Tortoise Range Map[9], which represents a reduction of about 121 mi^2.

Map 3-10 depicts three regions within the 2002 tortoise range: reduction areas, expansion areas, and areas requiring more surveys. These areas are discussed in detail in Appendix L.

9 Each of these figures over-estimates occupied tortoise habitat, as dry lake playas, elevations above about 4,500 feet, and other marginal or unsuitable habitats are included within both range lines. Nor do they imply anything about the relative of densities occurring in the older and more recent ranges.

2002 Tortoise Range Map



West Mojave Plan FEIR/S
Map 3-10

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Tortoise Distribution within the Revised Range: The TCS distribution map (Map 3-11 on attached CD Rom) was generated exclusively based on 1998 to 2002 sign count surveys. Map 3-11 uses TCS categories that have been traditionally used to estimate tortoise densities, which are useful to determine relative tortoise abundance and distribution. These categories include: 0, 1 to 3, 4 to 8, 9 to 16, 17 to 28, and 29 to 50 TCS/transect (i.e., which is mostly reported as "TCS/mi^2"). For convenience, the six categories are occasionally segregated into two categories of relatively low sign counts (0 to 8) or relatively high sign counts (9 to 50). The average number of TCS in DWMAs was found to be 5 mi^2, which was used as the demarcation to differentiate above- and below-average density areas.

This map reveals that there are few regions within DWMAs where tortoises are completely extirpated, or for other reasons, do not occur. It identifies areas where high sign counts were found on 261 transects, or conversely, no sign was found (transects along the Sierra Nevada, west of the aqueduct). In many cases, low-density areas may be adjacent to or surrounded by relatively higher density areas.

Natural Absences of Tortoises: Several safe assumptions can be made about tortoise distribution in the western Mojave Desert since the 1970s:

- Tortoises are mostly absent from dry lakebeds.
- Tortoises are absent from areas above 5,000 feet elevation, and nearly so at 4,500 feet. In 1999, only 5 of 609 (0.8%) transects with tortoise sign occurred above 4,000 feet; similarly, in 2001, only 12 of 991 (1.2%) transects with tortoise sign occurred above 4,000 feet. In 1998, all 875 transects were located below 4,500 feet.
- Tortoises may be naturally sparse in the northern portion of the range, from the Avawatz Mountains, through China Lake Naval Air Weapons Station, up to Rose Valley along Highway 395. Much of this area is protected on military installations or otherwise inaccessible to most casual desert visitors, yet no surveys since the 1970's have found significant areas of above-average tortoise sign. Weinstein (1989) found that latitude was a contributing factor to tortoise occurrence, and that in general densities decreased with increasing northern latitudes.

There are also places where local geological and hydrological factors may be responsible for relatively low tortoise numbers. The lavic flows associated with Black Mountain, north of Harper Lake, may be sufficiently unsuitable that tortoises are naturally uncommon, although there is an apparent abundance of tortoises at Pisgah Crater, a similar formation. During 1994, on the south-central and southwestern portions of Edwards Air Force Base (between South Rogers Dry Lake and Rosamond Dry Lake, including Buckhorn Dry Lake), the only tortoises found were restricted to a small hill that rose above the surrounding saltbush scrub, which was vegetated by the only creosote bush scrub observed in the region (LaRue, pers. obs.).

The more difficult question is, what is the evidence that tortoises occupied all areas where they are now presumed extirpated (missing)? Tortoises are extirpated from large portions

of the Lucerne and Victor valleys and from the entire western portion of Antelope Valley; what is the evidence that they ever occurred there? Lucerne Valley is relatively straightforward because a few tortoises can still be found along the base of the San Bernardino Mountains, south of the developed portion of the community. They are documented to the north, east, and west, so it is clear that Lucerne Valley once supported suitable habitat, if not fully occupied by tortoises prior to recent development.

The Victor Valley's southern demarcation of natural tortoise absence (from western Lucerne Valley through southern Hesperia, Oak Hills, Baldy Mesa, to Phelan) cannot be well defined with existing data, which have mostly been collected since the 1990 listing. With the exception of two questionable data points near the southwestern corner of Hesperia, no tortoise sign has been found south of Highway 18 from Apple Valley to Highway 395 since 1990 (see Map 3-6). Highways 18 and 138 generally separate areas to the south where tortoises are apparently absent from areas to the north, where habitats are substantially degraded and only a few residual aggregations occur[10].

In 1990, it was judged that only about 90 square miles within the 225-square mile City of Lancaster and its sphere of influence still supported potential occupied tortoise habitat (Tierra Madre Associates, Inc. 1991). Only three carcasses were found during surveys along 330 linear miles of transects (LaRue, pers. obs.). No evidence of living tortoises was found, nor has any been found over the last 12 years during surveys required by the City of Lancaster (Brian Ludicke, pers. comm.). Even so, these carcasses, and numerous accounts documented by Berry and Nicholson (1984) show that the Antelope Valley, west of Highway 14 was historically occupied. Data were found for only four or five surveys in the southern half of the Antelope Valley, west of Lancaster. No 1975-1982 BLM data were collected there.

Carrying Capacity: Carrying capacity is the inherent ability of the land to support a given number of tortoises per unit area. The tortoise carrying capacity of any area cannot be stated with precision, except for certain lands (such as playas and lands above 5,000 feet elevation) where the carrying capacity is zero. Based on Dr. Berry's study plot data, there were as many as 238 adult tortoises per square mile at the DTNA in 1982 and as many as 70 at Fremont Peak in 1979. These are more accurately described as 1979-1980 baseline population numbers for two square miles and an unknown contiguous area containing similar vegetation, and are not reflective of the carrying capacity of the two regions in which they occurred. Nor do they reflect trends in the population that preceded the 1970's, when the baseline studies were first conducted. The declines observed on these two plots between 1980 and 1996, however, do apparently reflect declines that were occurring on a regional scale during that time.

These studies do not reflect how many tortoises may have occurred in the region in the 1950s, for example, or in 1900. Had high tortoise populations existed and suffered catastrophic die-offs, sufficient time would have elapsed for all carcasses to disintegrate in the interim, leaving no indication of tortoise populations even 20 years before the first study plots were surveyed.

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10 For example, tortoise sign was found on only 1.5 mi^2 in a 20 mi^2 area surveyed in this region in 2002.

Boarman (pers. comm., Nov 2002) has suggested that the lower rainfall levels experienced in the second half of the 20th Century may have reduced productivity, thereby reducing the capacity of the land to sustain as many tortoises are previously. Oftedahl (pers. comm., Nov 2002) has suggested that long-term cattle grazing may have depleted the natural seed bank of plants with a high potassium excretion potential (see discussion above) and that it may be impossible to regain that seed bank, even if grazing is discontinued.

Nor does the Recovery Plan indicate how or when the baseline population numbers should be established. In fact, that baseline is currently being established through line distance sampling surveys, which were initiated in the western Mojave Desert in 2001. It may take up to five years to determine a statistically valid baseline population. If so, the baseline would represent a snap shot of tortoise densities in the year 2005.

3.3.2.5 Threats to Tortoises: Mortality Factors

Available literature presents many threats that are known or suspected to affect tortoises and their habitats. Dr. William Boarman (2002) identified 22 impacts that may affect tortoises throughout the listed population: agriculture, collecting, construction, disease, drought, energy and mineral development, fire, garbage and litter, handling and manipulation, invasive weeds, landfills, livestock grazing, military operations, noise, non off-highway vehicle recreation, off-highway vehicles, predation, roads and highways, urbanization and development, utility corridors, vandalism, and wild horses and burros. Dr. Boarman's analysis is included in its entirety as Appendix J.

Dr. Boarman's discussion of threats is general and is not restricted to physical impacts and miscellaneous threats that are known to occur in the West Mojave planning area. The following discussion focuses on threats present within the planning area. It addresses (1) direct and indirect anthropogenic (i.e. human-caused) mortality factors, (2) natural mortality factors, and (3) carcass observations and die-offs suggested by recent data. The relationship between off highway vehicles and tortoises, an issue that has received a high level of public interest, is addressed separately in Section 3.3.2.6 (below).

A detailed analysis of carcass observations is presented in Appendix L. The reader is encouraged to review that analysis as an adjunct to summary carcass observations presented in the following sections.

3.3.2.5.1 Direct and Indirect Anthropogenic Mortality Factors

There are both *direct* and *indirect* anthropogenic mortality factors (see Boarman 2002 for discussion). Direct mortality factors have immediate results (incidental mortality during construction, removal of animals from the desert), whereas indirect mortality factors occur over time, and are not always easily associated with the direct mortality factors from which they arise.

Direct Anthropogenic Mortality Factors: These include blading a pipeline right-of-way, tract home development, and similar land disturbances where native vegetation is removed and tortoises residing in the area are either crushed or forced to move into adjacent areas of

suitable habitat. Direct mortality factors also include crushing tortoises along paved and unpaved roads; intentional vandalism, such as shooting tortoises; pet collection; poaching for food or ceremonial purposes; loss of animals to fire; trampling by cattle; and animals lost to military maneuvers. Not all direct mortality factors are manmade; prolonged drought, wildfires caused by lightning, and naturally unsuitable geographical features (e.g., playas) are either direct mortality factors or natural features that directly affect tortoise densities and distribution (see Section 3.3.2.5.2, below).

Direct mortality factors are often researched in scientific studies, but such studies are typically limited in scope, for example, to a given cattle allotment or specific motorized race event. Such studies should not be dismissed, but they fail to identify either the geographical extent or severity of mortality factors on a regional scale.

To better understand both the distribution and severity of direct mortality factors on a regional scale, data recently collected in the field were used. These included 19 disturbance categories: Vehicles (Paved Roads, Dirt Roads, Trails, Tracks), Garbage, Shooting (Bullet Casings and Shooting Areas), Mining (e.g., test pits, markers), Campsites, Livestock (Sheep and Cattle), Wild Horses or Burros, Domestic Dogs, Fence lines and Posts, Utility Lines, Denuded Habitat, Partially Denuded Habitat, Old Buildings, and Military Ordinance. These data represent "observable human disturbances" and in many cases direct mortality factors. They are the basis for the following discussion.

The data have been used to to see *where* such impacts have occurred and are likely to persist or increase in the absence of proactive management. They allow the identification of areas where observable human impacts tend to be clustered or, alternatively, are uncommon. For example, the data clearly show that in DWMAs the most concentrated areas of cross-country vehicle tracks are adjacent to BLM open areas (particularly El Mirage and Johnson Valley) and desert communities (e.g., Silver Lakes). Data show that cattle are not constrained to allotments, as cow dung has been recorded up to several miles outside allotment boundaries. Illegal dumping is most common adjacent to urbanizing areas, as are domestic dogs. These data have been used to identify areas where focused management can further assess and remedy problems.

Direct mortality factors were recorded during both the 1998-2001 tortoise sign-count surveys and the 2001-2002 distance sampling surveys. Of 148 tortoises found dead where the suspected cause of death was given, 76 (51%) were attributed to mammalian predation (coyotes, kit foxes, occasionally feral dogs), 42 (28%) were identified as crushed by off-highway vehicles, 13 (9%) due to raven predation, 9 (6%) due to gunshot wounds, and 9 (6%) due to other causes.

Urbanization: Urbanization poses serious direct impacts to tortoises, and has resulted in regional extirpations, particularly within the southern and southwestern portion of its range. Historical records and anecdotal evidence indicate that tortoises once occupied all areas from eastern Antelope Valley, through Lancaster and Palmdale, Pearblossom, Lake Los Angeles, Hesperia, Victorville, Apple Valley, to Lucerne Valley. Current data for these areas show that

tortoises are either extirpated (Lancaster, western Palmdale, southern Apple Valley, central and eastern Victorville, all of Hesperia) or very nearly so (remaining areas)[11].

Indirect effects of urbanization are less clear than the direct effects of mechanically removing 10 acres of occupied tortoise habitat, but, cumulatively, they remove tortoises from the landscape as effectively as heavy equipment. Wide-spread dumping, sheep grazing, unregulated off highway vehicle traffic, release of hazardous materials (i.e., motor oil drained on the ground, discarded paint, etc.), tortoise collection, loss of tortoises and habitat degradation by feral and pet dogs, and increased raven numbers are just a few of the impacts associated with urbanization that extend far into the desert. Where residential communities are immediately adjacent to tortoise habitat (Barstow, northern Lucerne Valley, Silver Lakes/Helendale, Hinkley, Twentynine Palms, etc.) the impact may be even more threatening to core aggregations of tortoises.

Between 1990 and 2001, LaRue surveyed 78 different project sites in urbanizing areas for evidence of tortoises. Urbanizing areas included in the survey, among others, were Apple Valley, Baldy Mesa, Barstow, California City, Hesperia, Joshua Tree, Lake Los Angeles, Lancaster, Landers, Lucerne Valley, Newberry Springs, Palmdale, Phelan, Ridgecrest, Rosamond, Silver Lakes/Helendale, Victorville, Yermo, and Yucca Valley. Table 3-16 reports the prevalence, in descending order, of observable direct impacts associated with these (and other) urbanizing areas.

Table 3-16
Disturbances Observed on 78 Projects in Urbanizing Areas

DISTURBANCE CATEGORY	NUMBER OF PROJECTS WITH DISTURBANCE	DISTURBANCE ON 100% OF TRANSECTS
Cross-country OHV travel	74 (95%)	39 (50%) project sites
Dumping	72 (92%)	
Domestic dog sign	69 (88%)	20 (26%) project sites
Dirt roads	67 (86%)	28 (36%) project sites
Shotgun shells	59 (76%)	
Misc. ground disturbance	24 (31%)	
Evidence of sheep grazing	19 (24%)	

Cross-country OHV tracks, dumping, domestic dog sign, and dirt roads are prevalent in these urbanizing areas. The third column reports the number and percentage of the 78 sites where the indicated disturbance was observed on 100% of transects surveyed. Thus, 39 of the 78 projects (50%) had vehicle tracks, 28 of 78 (36%) had dirt roads, and 20 of 78 (26%) had dog sign on 100% of all transects surveyed.

These data are comparable to those collected by LaRue and others in 1991 in the 225 mi^2 Lancaster planning area, where tortoises historically occurred but are now extirpated (Tierra Madre Consultants, Inc. 1991). In that study, aerial photographs revealed that only 90 of the 225

11 Each of the following reports has identified extensive areas where tortoises no longer occur: (a) 225 square miles of Lancaster (Tierra Madre Consultants, Inc. 1991); (b) 200 square miles encompassing portions of Adelanto, Apple Valley, Hesperia, and Victorville (Tierra Madre Consultants, Inc. 1992); (c) 100 square miles of Palmdale (Feldmuth and Clements 1990); and (d) 38 square miles of Ridgecrest and Inyokern (Circle Mountain Biological Consultants 1997).

mi^2 within the planning area supported vegetation communities that may still support tortoises. The remaining 135 mi^2 were developed for residential, industrial, commercial, and agricultural purposes, and no longer constituted suitable habitats. Table 3-17 reports the prevalence of the disturbances listed above in Table 3-17 that were observed on 72 mi^2 in the Lancaster sphere on influence (2nd column) and 18 mi^2 within Lancaster's city limits (3rd column), which comprised the 90 mi^2 of potential tortoise habitat.

Table 3-17
Disturbances Observed in the Lancaster Planning Area in 1991

DISTURBANCE CATEGORY	PERCENT OCCURRENCE IN THE SPHERE OF INFLUENCE	PERCENT OCCURRENCE WITHIN THE CITY LIMITS
Cross-country OHV travel	81%	88%
Dumping	92	100
Domestic dog sign	77	72
Dirt roads	60	72
Shotgun shells	97	89
Misc. ground disturbance	7	16
Evidence of sheep grazing	100	100

Several attempts have been made to determine if there is a statistical relationship between increased human disturbances and decreased numbers of tortoises, with limited success (Dr. Ross Kiester, pers. comm. 2000). Fifty-eight of LaRue's 78 surveys recorded the total number of human disturbances observed on each transect, and either the presence or absence of tortoise sign. Tortoise sign was found on 25 project sites (43%) and absent from 33 (57%) of them. Table 3-18 shows the average number of disturbances observed (of the 10 categories given) per transect for each of these categories.

Table 3-18
Human Disturbance Levels Observed
25 Sites Where Tortoise Sign Was Found and 33 Sites Where Sign Was Not Found

DISTURBANCE CATEGORY	PREVALENCE OF DISTURBANCES PER TRANSECT	
	Tortoise Sign Present (25 sites)	Tortoise Sign Absent (33 sites)
Cross-country OHV travel	2.40	2.83
Domestic dog sign	1.37	2.59
Dirt roads	1.56	2.04
Dumping	0.72	1.50
Shot gun shells	0.63	0.57
Evidence of sheep grazing	0.59	0.44
Misc. ground disturbance	0.40	0.26

These data show that cross country travel, domestic dogs, dirt roads, and dumping were relatively more prevalent on urban sites where tortoise sign was absent. Both direct and indirect impacts associated with these human uses result in degraded habitats and loss of tortoises.

In Table 3-19, data collected between 1998 and 2002 on 1,572 transects in the Fremont-Kramer and Superior-Cronese DWMAs are compared to disturbances observed on the 78 urban

sites surveyed by LaRue between 1990 and 2001. These two DWMAs were chosen for their relative proximity to the urban and rural sites surveyed by LaRue.

Table 3-19
Comparison of Disturbances: DWMAs and Urbanizing Areas

	NUMBER (%) OF PROJECTS AND TRANSECTS WITH DISTURBANCE	
DISTURBANCE CATEGORY	ON 78 SITES IN URBAN AREAS	ON 1,572 TRANSECTS IN TWO DWMAS
Off-road OHV tracks	74 (95%)	833 (53%)
Dumping	72 (92%)	27 (2%)
Domestic dog sign	69 (88%)	6 (< 1%)
Dirt roads	67 (86%)	702 (45%)
Shotgun shells	59 (76%)	326 (21%)
Misc. ground disturbance	24 (31%)	26 (2%)
Sheep grazing	19 (24%)	200 (13%)

Human disturbances on the rural and urban sites surveyed by LaRue were significantly more prevalent than the same disturbances observed in two of the proposed conservation areas. Unimproved, dirt roads (53%) and OHV cross-country travel (45%) were the two most prevalent human disturbances observed in the proposed conservation areas. Domestic dog sign (< 1%), dumping (2%), and miscellaneous ground disturbance (i.e., denuded and partially denuded areas) (2%) were negligible in DWMAs compared to urbanizing areas (i.e., 88%, 92%, and 31%, respectively).

Maintained Roads: Trombulak and Frissell (2000) concluded that maintenance and use of roads contribute at least five different general classes of chemicals to the environment: heavy metals, salt, organic molecules, ozone, and nutrients. They found that most studies indicate that contamination declines within 65 feet (20 meters) but that elevated levels of heavy metals often occur 650 feet (200 meters) or more from the road. However, there is no evidence that chemicals are used on roads in the Mojave,

Nor are the effects of these contaminants on tortoises known. Dr. Berry, in collaboration with Dr. Bruce Homer, has suggested that heavy metals may be involved in the tortoise shell disease known as cutaneous dyskeratosis. The relationship between contaminants and cutaneous dyskeratosis is not understood, nor is the lethality of the shell disease. It was associated with a region-wide die-off of tortoises on the Chuckwalla Bench (i.e., decline from 225 tortoises in 1982 to 85 in 1992), but not necessarily the cause of it. The Chuckwalla Bench die-off was coincident with the 1988-89 die-off at the Desert Tortoise Natural Area, although 200 miles separate the two areas.

Tortoises often dig their burrows in the berms of roads, particularly along those that are not frequently used, and where there is little vehicle stray (LaRue, pers. obs., Copper Mountain Mesa, between Yucca Valley and 29 Palms). An erosion ditch found along Highway 395 apparently attracted at least one tortoise near that highway (LaRue 1992). Tortoises in such burrows would be in immediate harm's way during road maintenance that involved re-contouring road shoulders, erosion ditches, and berms.

There are places, such as one lightly used road in the Copper Mountain Mesa area, where 15 active tortoise burrows were found in the berms of a 1.5-mile long stretch of this road. However, this may be an exception. For example, only 1 occupied burrow of 202 found during sign count surveys was recorded as occurring in the berm of a road.

Lovich and Bainbridge (1999) reported that increased water availability from pavement runoff and increased retention of moisture under the pavement are probably responsible for the observed increase in plant vigor along roadsides. Vollmer et al. (1976) reported that productivity, diversity, and cover of Mojave Desert vegetation have been found to increase along roadsides. One problem associated with these "greenbelts" is that tortoises may be attracted to the vegetation and be crushed by normal use of the road, primarily, but also occasionally by maintenance activities. Boarman et al. (1996) indicated that tortoises are probably attracted to the edges of highways because increased water from rain collects along the shoulder facilitating growth of plants, some of which are species preferred by tortoises. Nicholson (1976) reported that tortoises might be attracted to roadsides, especially during a dry year, by the denser vegetation growing there.

Indirect Anthropogenic Mortality Factors: By their nature, indirect mortality factors are more difficult to quantify, and are in effect extensions of direct mortality factors.

Cattle and sheep grazing, cross-country OHV travel, blading rights-of-way for new construction, and agriculture (direct mortality factors) promote soil conditions that favor plant species that are not native to the desert, such as European weed species. Poor nutritional qualities of weeds may result in physiological conditions that leave tortoises more susceptible to disease and drought. Jennings (1997) summarized impacts of exotic plants as follows: (a) exotic plants are spread by roads and along utility lines; (b) exotic plants may pose threats to desert tortoises by competitively reducing or excluding important native forage species, compromising nutrition and health, and by contributing to the frequency and severity of fires in a region where fire was previously rare; (c) annual exotic grasses, *Schismus* sp., may be relatively deficient in key nutrients and may contain higher levels of metals than native plants.

Avery (1998) has found, during experimental tortoise foraging studies, that some tortoises prefer *Schismus*, an exotic, to all other native and non-native species he provided. Avery (1998) further found that dietary nitrogen in exotic plants was assimilated at significantly lower rates; tortoises were physiologically more capable of utilizing native vegetation compared to exotic vegetation; tortoises fed exotic plants lost body mass; and native vegetation was more nutritionally beneficial to desert tortoises than exotic vegetation [(see also Nagy et al. 1998, and Hazard et al. 2001)]. Johnson and Belnap (1996) found that shifts in vegetation resulting in exotic dominated stands could alter soil biota compositions and create conditions unfavorable to native plants.

Not all studies have found that tortoises prefer non-native forage. Jennings (1992) found that tortoises he studied at the DTNA preferred native species. Avery et al. (1997, 1998) found that tortoises consumed some exotic annuals (i.e., *Schismus barbatus* and *Erodium cicutarium*) but did not prefer them. Krzysik (1994) concluded that tortoises forage on exotic annuals, but the impact of these exotics on native ecosystems is unknown, and may remain unknown because

baseline data are lacking. Grasses provide much lower quantities of protein than do forbs (Nagy et al 1998, Hazard et al. 2001), and may be relatively more abundant in habitats degraded by grazing, fire, and other ground disturbances.

These weeds in turn serve as fuel for wildfires. Lovich and Bainbridge (1999) reported that exotic annual plants, particularly red brome (Brooks 1998, Oldemeyer 1994), increase the fuel load and frequency of fire in desert communities, which are poorly adapted to fire. Red brome, split grass, Russian thistle, and mustards (particularly in fallow agricultural fields) provide fuels that burn hotter and carry flames between shrubs, thereby promoting the spread of fire and relatively more damage to native shrubs. (Brown & Minnich 1986; Brooks 1999.) Minnich (1994) reported that flames are carried by exotic species, notably *Bromus rubens*, *Schismus barbatus*, and *Brassica tournefortii*, which form a continuous, cured layer of flashy fuels; and that the greatest short-term impact of desert fires is the destruction of *Larrea tridentata* (creosote bush).

Ravens represent a direct impact to juvenile tortoise populations, but they are also an indirect impact (or symptom) of urbanization. Ravens are as common as they are because of increased opportunities provided by humans. Roads provide a ready source of raven food in the carcasses of small mammals and reptiles that result from vehicle collisions; increased nesting opportunities are provided by human structures; water is readily available at pastures, farmlands, sewage ponds, and wildlife guzzlers. Yet, ravens are often identified as "natural" predators of tortoises. In fact, ravens are subsidized predators, possibly preying on tortoises and other animals to get them through the summer and winter when resources are less plentiful (Boarman 1993).

The denuded hillsides that result from OHV hill climbs are extremely susceptible to erosion (indirect mortality factor), particularly if mechanized vehicles continue to frequent the area (a direct mortality factor). Both forage and shrub cover, which are critical to tortoise nutrition and denning, respectively, are adversely affected. In time, tortoises may abandon the area or suffer ill side effects from poor nutrition (i.e., malnourished, suppressed immune systems, etc.) or reduced denning potential (i.e., resulting in more exposure to predators and additional vehicle impacts).

Indirect mortality factors may occur far into the future and are often unforeseen. For example, the direct impact of a water pipeline is immediately mitigated and compensated, tortoises are moved from harm's way with appropriate take permits, and the project is effectively complete, but the indirect effects are just beginning. Dozens of residents each year excavate their own ancillary pipeline trenches to connect into the main water line; these go unmonitored and tortoise protection is relegated to whoever is digging the trench. Such projects are the infrastructure that is intended to promote human population growth that will eventually eliminate animals from those regions. Mechanically denuded rights-of-way are often used for vehicle travel and may provide new access to tortoise populations that were not previously accessible to non-four-wheel drive vehicles. This was the case for extensive stretches of the Meade-Adelanto transmission line that was installed in 1995. Not only were 174 tortoises handled and 3 accidentally killed (LaRue 1996), but the line passed through areas where no previous utilities had passed, thereby opening new access to many areas.

Noise: Krzysik (1994) stated: "...noise and vibrations associated with live-fire exercises [at Fort Irwin] are detrimental to wildlife populations," but did not provide any data to support the conclusion. The Recovery Plan (USFWS 1994) listed the following potential impacts, again without any data to support the conclusions. Noise impacts may cause disruption of communication and damage to the auditory system, which may affect an individual's ability to effectively communicate and respond in appropriate ways. In several places, the Recovery Plan referred to "noise pollution" or listed noise as one of the potential impacts, but provided no specific data.

In his threats analysis, Dr. Boarman (2002) reiterated the information given in the Recovery Plan, which is recited above, plus the following observations. A study conducted by Bowles et al. (1999) showed very little behavioral or physiological effect on tortoises of loud noises that simulated jet over flights and sonic booms. They also demonstrated that tortoise hearing is fairly sensitive (mean = 34 dB SPL) and was most sensitive to sounds between 125 and 750 Hz, well within the range of the fundamental frequency of most of their vocalizations. The authors concluded that tortoises probably could tolerate occasional exposure to sonic boom level sounds (140 dB SPL), but some may suffer permanent hearing loss from repeated long-term exposure to loud sounds such as from OHV and construction blasts. Boarman (2002) also indicated noise or vibration might affect tortoises that live alongside railroads, but found there were no studies to document the impact. He concluded, it is not known if train noise negatively affects the behavior, audition, or reproductive success of these tortoises.

Habitat Recovery Rates: Lovich (1992) reported that recovery to pre-disturbance plant cover and biomass may take from 50-300 years while complete ecosystem recovery may require over 3,000 years. Webb et al. (1983), citing Lathrop and Archbold (1980), predicted a recovery time of a century for pipeline berms and trenches, pipeline road edges, and powerline pylons and road edges. They state that an estimate of recovery based on vegetative composition could be "at least three times greater" than the estimate for biomass, again assuming that recovery follows a linear trend. These researchers were referring to natural rehabilitation of unused sites. There is little or no opportunity for perennial plants to become re-established on road shoulders, erosion ditches, etc. that are regularly maintained.

3.3.2.5.2 Natural Mortality Factors

This section addresses "natural" mortality factors, including predators, drought and disease. The term "natural" does not, however, mean that these occur independently of man. Although some mortality factors may naturally occur, they are often exacerbated by human activities that have affected the natural balance that likely existed prior to man's use of the desert. Disease is discussed in this section, although its origin in wild tortoises (i.e. a natural occurrence) or pet populations (i.e. introduced by man) remains unknown. Natural predators of post-hatching tortoises include golden eagle, common raven, badger, coyote, kit fox (Berry 1990, Boarman 2002).

Canine Predators: This includes coyotes, kit foxes, and feral dogs, the latter of which is not a "natural" predator[12]. In 1982, Luckenbach concluded coyotes were probably the major predator of adult desert tortoises. Turner et al. (1997) determined that most failed tortoise nests were excavated by coyotes or kit foxes, but no data were presented (Boarman 2002). Turner and Berry (1985) reported that 76 of 159 (48%) tortoise nests at the Goffs Study plot in the East Mojave were lost to kit foxes and other predators. During his three-year study at the DTNA in the early 1990's, Peterson (1994) concluded that coyote predation was the main mortality factor observed. In 1998 and 1999, 47% and 12%, respectively, of nests studied at Twentynine Palms Marine Corps Base were dug up, probably by kit foxes (Bjurlin and Bissonette 2001). Predation by kit foxes and coyotes on tortoises may increase during periods of drought, when their normal prey base of small mammals is no longer available (Peterson 1993, 1994; Karl 2002).

Feral dogs also injure and kill desert tortoises, and are relatively more common adjacent to urban and rural communities than elsewhere. Domestic dog sign was found on 88% of the sites surveyed in urbanizing areas (LaRue, unpublished data) and on 75% of the transects surveyed in Lancaster (Tierra Madre Consultants, Inc. 1991). Comparatively, dog sign was observed on only 6 of 1,572 (i.e., <1%) transects surveyed in the Fremont-Kramer and Superior-Cronese DWMAs (WMP data, 1998 to 2002).

When 1998-2002 sign count data are combined with 2001-2002 distance sampling data, 76 of the 148 (51%) carcasses, where the cause of death was given, were recorded as being predated (or scavenged) by canine predators. The prevalence of canine predation did not differ between sign count data collected throughout the planning area (i.e., 53 of 104 carcasses, or 51% canine predation) and distance sampling data collected only within the two DWMAs (i.e., 23 of 44 carcasses, or 52%)).

USFWS (1994b) reported damaged burrows and two severely injured tortoises along Highway 58 in Kern County in the early 1970's, and many of the tortoises observed at the Lucerne Valley study plot in 1986 and 1990 had been gnawed or chewed by dogs. Berry (1990 as amended) reported evidence of domestic dog or cat predation at 4 of 12 study plots in California, where predation ranged from 1.8% up to 45.3% (Boarman 2002). Feral dogs have injured tortoises at 29 Palms Marine Corps Base (Rhys Evans, pers. comm.), and one death has been confirmed (Bjurlin and Bissonette 2001). Tortoises with chewed marginal scutes, and missing legs were particularly common to the south where the installation is bordered by the urbanizing portions of Twentynine Palms and the community of Joshua Tree (Peter Woodman, pers. comm.). Boarman (2002) concluded that the effect of feral dog predation on tortoise populations appears to be an emerging problem that warrants further documentation.

Common Ravens: Knowles and Berry (1990) found that ravens were most abundant in the West Mojave and least abundant in the southern Colorado Desert (also, Boarman 1992). Their 1989 study indicated that ravens were most common at landfills, agricultural fields, and along roads in the fall, declining through winter, spring, and summer. Landfills, followed by

[12] Feral dogs may include individual animals, or dogs packs, consisting of 10 or more animals (LaRue, pers. obs.). The word, "feral," literally means "wild" or "untamed," and in the West Mojave, consists of domestic pets that have permanently left their owners or may return to their homes following forays into the desert.

agricultural fields, were the most common concentration areas. Only three of 17 sewage ponds showed consistent use by ravens.

Based on Breeding Bird Surveys (Robbins 1986) conducted by the USFWS, BLM (1990) estimated that the number of ravens in the Mojave Desert had increased by 1,528% between 1968 and 1988. Boarman (1992) felt that the increase was likely much higher in the West Mojave. Knowles *et al.* (1989a, 1989b) surveyed 801 linear miles of roads, 12 landfills, and 11 sewage ponds in the West Mojave, every two weeks throughout 1989. They found ravens concentrated around landfills, sewage ponds, agricultural fields, and urbanized areas. The highest density areas (i.e., between 250 and 1,000 ravens/100 mi^2) included the Victor Valley, Lancaster-Palmdale area, and around Ridgecrest (reported in Chambers Group, Inc. 1990).

Increased Raven Populations in Response to Human Resources: Boarman (1992) described ravens as "...predatory animals that survive and perhaps grow in part due to food, water, or other limiting resources provided by or associated with human activities. As a result of their association with humans, the populations are allowed to grow well beyond the natural carrying capacity of the habitat." Raven populations have likely increased due to increased availability of foods (e.g., landfills, sewage ponds, dumpsters, highways, cities) and water (e.g., sewage ponds, agricultural fields, golf courses), which sustain more individuals during times of low natural resource availability, such as winter and summer. Such artificial food sources may facilitate larger clutch sizes or increased frequencies of clutches and greater fledging success. In addition, human-made structures have increased numbers and distribution of perches and nest sites (e.g., power and telephone poles, bridges, billboards, freeway overpasses, etc.) (Boarman 1992, USFWS 1994b).

Prevalence of Raven Predation in the West Mojave Compared to Elsewhere: Boarman (2002) reported that the extent of raven predation could be estimated by evaluating juvenile tortoise carcasses found throughout the desert. He found that Campbell (1983) had reported 136 shells along the perimeter fence at the DTNA, which he attributed to raven predation. Over a four-year period in the early to mid-1980s, Woodman and Juarez (1988) found 250 tortoise carcasses beneath one raven nest near the Kramer Hills. Mean carapace length of the carcasses became progressively smaller over the four years (Woodman, pers. comm.), suggesting that ravens had removed most of the relatively larger animals, and were beginning to seek out smaller, harder to find tortoises. Krzysik (1994) reported that raven predation accounted for 4.5% of the tortoise mortality observed at Fort Irwin. During 1988 and 1990 surveys of various Fort Irwin expansion area alternatives, however, Chambers Group, Inc. observed no evidence of raven predation.

Between 1998 and 2002, of the 1,033 tortoise carcasses found throughout the WMP, cause of death was determined for 104 (10%) of them (WMP, unpublished data). Of these 104 carcasses, raven predation (or scavenging) was identified for 10 (9%) of them. These results are similar to those collected during distance sampling in the Fremont-Kramer and Superior-Cronese DWMAs in 2001 and 2002: cause of death was determined for 44 of 764 (6%) carcasses, and raven predation (or scavenging) was identified for 7% (i.e., 3 of the 40 carcasses). Thus, two independent data sets from the same region and time period attributed raven predation (or scavenging) to 9% (13 out of 148) of the carcasses found where the cause of death was given.

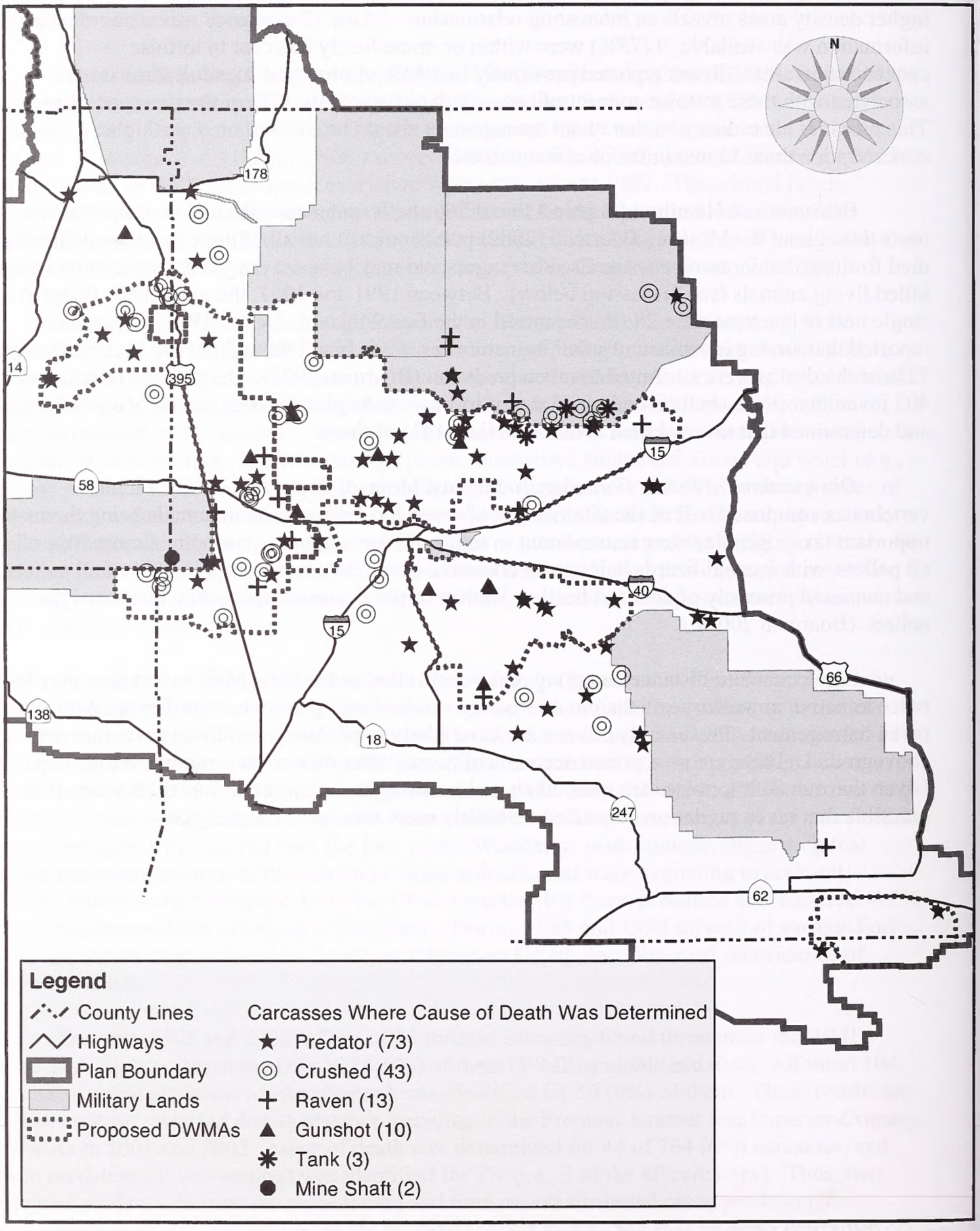
The spatial distribution of 12 of 13 raven-predated carcasses (see Map 3-12) relative to higher density areas reveals an interesting relationship. Of the 12 carcasses where coordinate information was available, 9 (75%) were within or immediately adjacent to tortoise concentration areas. It was reported previously that 43% of observed subadult tortoises are associated with these tortoise concentrations, which occur in only 17% of the surveyed areas. This provides clear direction that raven management should be focused on these higher concentration areas to maximize its effectiveness.

Boarman and Hamilton (in prep.) found 266 shells under an unknown number of raven nests throughout the Mojave. Boarman (2002) points out that not all of these tortoises definitely died from predation, as ravens are also scavengers and may have scavenged carcasses rather than killed living animals (see discussion below). Between 1991 and 1997, the most shells found at a single nest in one year were 28 (this occurred in the East Mojave). Berry (1990, as amended) reported that among juvenile and small immature carcasses found throughout the Mojave Desert, 72% of the deaths were attributed to raven predation (Boarman 2002). Berry (1985) evaluated 403 juvenile tortoise shells found on 27 desert tortoise study plots throughout the Mojave Desert, and determined that ravens killed about 35% (i.e., 141) of them.

Observations of Raven Foraging: In the East Mojave, Camp et al., (1992) found vertebrates comprised half of the total weight of raven food items, with mammals being the most important taxa. Reptiles were unimportant in terms of biomass, but occurred in almost 76% of all pellets, with iguanid lizards being most common. Invertebrates occurred in 90% of all pellets, and consisted primarily of ants and beetles. Human refuse occurred in almost a quarter of the pellets. (Boarman 2002).

Sign count and distance-sampling data suggest that in the West Mojave tortoises may be twice as active in wetter years than in drier years. These findings may be significant relative to raven management. Presumably, ravens are more likely to predate subadult tortoises that are aboveground. There are no reported accounts of ravens entering burrows to remove tortoises. Given that subadult tortoises are more likely to be aboveground in wetter than drier years, it is plausible that raven predation may affect relatively more tortoises in wetter years.

Tortoise Carcass Distribution



West Mojave Plan FEIR/S
Map 3-12

Scale: 1 : 1,320,000

0 10 20 30 Km

0 10 20 30 Miles

7/29/04

Predation Versus Scavenging of Juvenile Tortoises: Ravens are both scavengers (i.e., feeding on carcasses of animals they did not kill), and predators (i.e., killing and feeding on animals).

The Recovery Plan (USFWS 1994b) cited three types of evidence that ravens prey on, and not just scavenge, juvenile tortoises: (a) Ravens have been observed killing juvenile tortoises; (b) Large numbers of juvenile carcasses show signs consistent with raven predation; and, (c) large numbers of juvenile carcasses are found in and at the base of raven nests, as well as near perches. Boarman and Hamilton (in prep.) concluded ravens prey on tortoises throughout the Mojave Desert, but probably not all ravens nesting in tortoise habitat prey on tortoises.

Available data suggest that ravens prey on tortoises that are 110 mm (about 4 inches) or less in length [Berry 1985, Boarman and Hamilton (in prep)]. The 136 carcasses Campbell (1983) found at the DTNA were between 36 and 103 mm. Farrell's (1989) raven-predated carcasses in the East Mojave ranged in size from 42 to 110 mm. Intact, adult carcasses are rarely reported beneath raven nests; finding parts of larger tortoises at raven nests probably signifies scavenging rather than predation.

Effects of Ravens on Regional Tortoise Populations: Although the above anecdotal evidence and focused studies have found that ravens do predate (and scavenge) tortoises, and that predation may be locally common, the relative impact of ravens on regional tortoise populations remains unknown. There are no data available to accurately determine tortoise population levels, so there is no ready means of determining what percent of the population is affected. Available data indicate that about 9% of the tortoise carcasses found where cause of death could be determined were attributed to raven predation.

Available information suggests that ravens are opportunistic predators of small tortoises, and that some individuals or pairs of birds are likely to be responsible, rather than the entire raven population. It is apparent for many predators that they seek out prey items that are relatively abundant, and that they will switch from one prey species to another if preferred prey populations diminish. This is suggested by the observations of Woodman and Juarez. In their case, the first carcasses found beneath the nest were relatively larger than the smaller carcasses subsequently found. A plausible explanation is that the pair of ravens selected relatively larger, more easily found carcasses until they were depleted. Then, gradually, they adjusted their search image to find smaller tortoises, which are presumably more difficult to locate.

If this scenario proves to be true, raven predation would most likely occur where subadult tortoises are abundant, which coincides with the higher density areas, according to sign count data. However, the relative impact of ravens may be more significant in depleted tortoise populations, where every subadult is relatively more important to the future survival of that local or regional population.

Dr. Boarman, probably the foremost expert on raven predation in this population, concluded, "In the sense of hard science, these observations [of raven predation] do not consist of proof that ravens are causing significant harm to tortoise populations, but they do support the hypothesis" (Boarman 1992). In their synopsis, National Ecology Research Center (1990)

concluded, "Conflicting evidence and incomplete data sets make analysis of raven-tortoise interactions a difficult task. We cannot determine the effect of ravens on tortoise populations throughout the Mojave Desert. However, it appears that ravens may decrease juvenile tortoise numbers in localized areas." BLM (1990) concluded, "At this point the contribution of avian predation to tortoise population mortality remains unknown… Whether they [common ravens] can significantly depress a tortoise population is open to question."

Efficacy of Raven Management Previously Applied: BLM implemented the first focused raven reduction program in 1989, using firearms and poison to eradicate ravens at two sites in the West Mojave (Rado 1990). In 1989, between 106 and 120 ravens were poisoning with Starlicide-treated baits at the 29 Palms Marine Corps Base landfill (Rado 1990). Rado concluded that the BLM's raven control program had substantially reduced the number of ravens at both the base landfill and at the DTNA. However, there have been no follow-up studies to see what current raven populations are in these two places, so long-term effects of the reduction are unknown.

Boarman (1992) has reported that covering refuse with at least 6 inches of soil, the replacement of open landfills with enclosed transfer stations, and other measures would result in less available food, and may lead to reduced raven numbers. He felt that the most effective control for long-term raven management must address anthropogenic food sources and require low maintenance (Boarman 1992).

Drought: Boarman (2002) concluded that drought might cause episodic tortoise mortality that is punctuated by periods of low mortality during years with more abundant rainfall). He speculated that drought-induced stress in concert with other threats (e.g., disease, predation) might have resulted in significant mortality (Peterson 1994a).

One obvious effect of drought is the lack of available water for tortoises and other desert-adapted wildlife. Boarman (2002, pers. comm. from Dr. Kenneth Nagy) reported that tortoises can probably survive one to two years without drinking water but will start dying of dehydration after that. In very dry years, there is no production of annual plant species, which provide a substantial portion of a tortoise's annual intake of water. In somewhat wetter years, annual production may be restricted to a few species, or there may be only a few individual plants of a wide array of species that germinate. The nutritional quality of these species becomes relatively more important when they are in limited supply and comprise a tortoise's entire dietary intake for a given season. Boarman (2002) reports that Turner et al. (1984) and Avery (1998) found that tortoises might survive drought periods by eating less nutritious cacti and shrubs.

Desert Washes and Drought: The 261 tortoises observed during sign count surveys were observed in only six different plant communites. Tortoise occurrence within each of the six communities and the percent of the planning area occupied by each community (WMP 1996 vegetation map) are given in Table 3-20 (listed in descending order of tortoise occurrence):

Table 3-20
Prevalence of Tortoises in the Six Plant Communities Where Observed

PLANT COMMUNITY	% PLANNING AREA OCCUPIED BY PLANT COMMUNITY	NO. SIGN COUNT TORTOISES OBSERVED 1998-2002	% TORTOISES DIVIDED BY % COMMUNITY
Mojave Creosote Bush Scrub	63%	242 (92.7%)	1.5
Desert Saltbush Scrub	9%	14 (5.4%)	0.6
Mojave Desert Wash Scrub	0.3%	2 (0.7%)	**2.3**
Mojave Mixed Woody Scrub	11%	1 (0.4%)	0.4
Shadscale Scrub	0.5%	1 (0.4%)	0.8
Stabilized, Partially Stabilized Sand Dunes	0.3%	1 (0.4%)	1.3
Total	**84.1%**	**261 (100%)**	**N/A**

The data indicate that 261 observed tortoises occurred in six plant communities, which cover about 84% of the planning area. About 98% of the tortoises (256 of 261) occurred in creosote bush and saltbush scrub, which encompass 72% of the area. The key observation (and reason these data are given in this section) is that two tortoises were observed in Mojave Desert Wash Scrub, which occupies only 0.7% of the planning area. One can see in the fourth column, where the percent of tortoises is divided by the percent occurrence of each plant community, that the highest ratio (2.3) was observed in Mojave Desert Wash Scrub. This may suggest that tortoise occurrence in wash scrub is relatively more common when one considers how little of the planning area is occupied by this plant community.

There may be compounding circumstances, or synergistic effects, between the impacts of drought and the use of desert washes by both tortoises and recreational users. In relatively dry years it is common to see a wide swath of green shrubbery growing along washes in an otherwise gray-brown landscape. A creosote bush growing alongside a wash may be bright green and twice the size of all the creosote bushes within 100 feet of the wash. There are times when the only place where annual germination occurs is along the margins of washes (LaRue, pers. obs; Dave Morafka, pers. comm.). Tortoises have been documented to use washes as travel corridors seeking what appeared to be preferred, native forage (Jennings 1997). Wash resources support both sensitive bird and bat species. Water is nearest to the surface where washes and dry lakes occur. As a drought progresses, the last places remaining green in the absence of supplemental rainwater are along washes.

Recent evidence suggests tortoises may concentrate along washes in time of drought. For example, in the southeastern California desert, near Blythe, all tortoises found during one survey were restricted to several large tributaries along McCoy Wash and adjacent upland areas out to several hundred feet (Circle Mountain Biological Consultants 2000). Importantly, much of the site was below 600 feet elevation, which is about 400 feet below the "typical" 1,000 feet lower elevation threshold observed in many places for tortoises. Circle Mountain concluded that the wash, with its thick palo verde growth, provided sufficient resources for several animals to live in an otherwise inhospitable environment.

In October 2002, on a 100-acre site in eastern Twentynine Palms, four of five tortoises (including a hatchling and one-year old tortoise) were found in relatively thick growth of big galleta (a perennial grass) alongside two intermittent streams (Circle Mountain Biological Consultants, 2002.). Scat and burrows were found throughout the site, but four of five tortoises were clearly associated with washes. More recently (November 2002) during a training exercise located west of California City and east of Highway 14, 11 tortoises were observed, 10 of which were located within or immediately adjacent to Cache Creek (LaRue, pers. obs).

Based on the above observations, it is plausible that tortoises may concentrate around washes during drought conditions, which would put them at heightened risk if vehicles were concurrently using the washes. In extreme conditions, presumably even the wash-adapted plants will become dry. Given the relative denseness of the plant growth along washes, this may put them at some heightened risk for vehicle-caused fires. Certainly, there is no way to avoid drought, however restricting vehicle travel in washes may be the only mechanism available to minimize drought-related vehicle impacts to tortoises that are relying on washes for sustenance and cover.

Disease: Boarman (2002) provided the following summary on tortoise diseases (see his literature cited section for full references). Diseases can weaken individuals, reduce reproductive output, and cause mortality. Epidemic outbreaks of some diseases can become catastrophic, particularly in small or declining populations (Dobson and Meagher 1996, Biggins et al. 1997, Daszek et al. 2000). Upper Respiratory Tract Disease (URTD; Jacobson et al. 1991) and cutaneous dyskeratosis affecting the shell (Jacobson et al. 1994) are the two diseases most often implicated in tortoise declines. A third disease, a herpesvirus, was recently identified and may have population-level consequences, but very little is known about its relative mortality on infected tortoises (Berry *et al.* 2002, Origgi *et al.* 2002).

URTD has been found in several populations that have experienced high mortality rates, including some in the West Mojave (Jacobson et al. 1996, Berry 1997). Brown et al. (1994a) showed definitively that URTD could be caused by the bacterium, *Mycoplasma agassizii*. A second species, to be named "*Mycoplasma cheloniae*," was found in 2001 in tortoises in northern Lucerne Valley and at the DTNA (Kristin Berry, pers. comm.).

URTD, also referred to as "mycoplasmosis," is likely transmitted by contact with a diseased individual or through aerosols infected with *M. agassizii* or *M. cheloniae*. The organism attacks the upper respiratory tract causing lesions in the nasal cavity, excessive nasal discharge, swollen eyelids, sunken eyes, and in its advanced stage, lethargy and probably death (Jacobson et al. 1991, Schumacher et al. 1997, Homer et al. 1998, Berry and Christopher 2001). It must be noted, however, that some of these clinical signs may also be characteristic of other health conditions such as dehydration, allergy, or infection with herpesvirus or the bacteria *Chlamydia* or *Pasteurella* (e.g., Pettan-Brewer *et al.* 1996, Schumacher *et al.* 1997).

Malnutrition is known to result in immunosuppression in humans and turtles (Borysenko and Lewis 1979) and is associated with many disease breakouts. It is possible that nutritional deficiency in tortoises caused by human-mediated habitat change and degradation may be partly responsible for the apparent spread of URTD and its perceived impact on tortoise populations

(Jacobson et al. 1991, Brown et al. 1994a). Short-term droughts may temporarily reduce immune reactions and increase susceptibility to URTD (Jacobson et al. 1991), although this is speculative. Whereas animals may become debilitated by chronic immune stimulation, no biochemical indicators of stress have been identified in diseased compared to non-diseased turtles (Borysenko 1975, Grumbles 1993, Christopher *et al.* 1993, 1997).

Although evidence indicates a correlation between high rates of mortality and incidence of URTD within populations (Berry 1997), there is little direct evidence that URTD is the cause of the high rates of loss. In two preliminary analyses (Avery and Berry 1993, Weinstein 1993), animals exhibiting clinical signs of or testing positively for URTD were no more likely to die over a one year period in the western Mojave Desert than were those not exhibiting signs or testing positive. This may be because factors other than disease caused much of the mortality or many animals not showing clinical signs of disease in the field were still infected.

A shell disease, cutaneous dyskeratosis (CD), has been identified in desert tortoise populations (Jacobson *et al.* 1994). CD consists of lesions along scute sutures of the plastron and to a lesser extent on the carapace. Over time, the lesions spread out onto the scutes. This disease may be caused by the toxic effect of chemicals in the environment, but evidence is lacking to test this hypothesis. Naturally occurring or human-introduced toxins such as selenium, chlorinated hydrocarbons, organophosphates, nitrogenous compounds, and alkaloids have all been implicated (Homer *et al.* 1998), but there are no data showing a direct link. The disease may also be caused by a nutritional deficiency (Jacobson *et al.* 1994). It is not known whether or not CD is caused by an infectious pathogen or if secondary pathogens act to enhance the lesions (Homer *et al.* 1998, Homer pers. comm.). It is unclear if the disease is actually lethal or responsible for declines in infected tortoise populations (Homer *et al.* 1998).

If the shell diseases are toxicoses, toxic responses to environmental toxins (e.g., heavy metals, chlorinated hydrocarbons, organophosphates, and selenium), then there may be a direct link between these diseases and human activities unless the toxin is a natural component of the physical environment. Chaffee *et al.* (1999) found no significant correlation between elevated levels of metals in organs of ill tortoises and in the soil where the tortoises came from.

There is some recent, albeit weak, preliminary evidence linking heavy metals to disease in tortoises. In necropsies of 31 mostly ill tortoises, Homer *et al.* (1994, 1996) found elevated levels of potentially toxic metals and minerals in the liver or kidney of one or more of the animals. Since most of the animals were ill to begin with, an association was made between the presence of the toxicants and presence of the disease. However, that study is strictly correlative, and fails to demonstrate a cause and effect relationship. Berry (1997) claims, "the salvaged tortoises with cutaneous dyskeratosis had elevated concentrations of toxicants in the liver, kidney, or plasma...and/or nutritional deficiencies." Homer (pers. comm.) has found significantly reduced levels of calcium in the livers of tortoises with CD, which suggests a nutritional deficiency may be involved in the disease.

Several other diseases and infections have been identified in desert tortoises (Homer *et al.* 1998). These include a poorly known shell necrosis, which can result in sloughing of entire scutes; bacterial and fungal infections; and urolithiasis, a solid ball-like deposition of urate

crystals in the bladder (i.e., bladder stones; Homer *et al.* 1998). There is no evidence to suggest that any of these diseases are at this time widespread, threatening population stability, or hindering population recovery.

During sign count surveys in the fall and winter of 1998 through 2002, disease symptoms were observed in 7 of the 275 (2.5%) tortoises inspected. During distance sampling surveys in the spring of 2001 and 2002 in the Fremont-Kramer and Superior-Cronese DWMAs, 6 of the 216 (2.8%) tortoises inspected showed clinical evidence of disease. These very similar, independently derived results (i.e., 2.5% versus 2.8% of the tortoises observed) are summarized in Appendix L.

Evidence of URTD and possible cutaneous dyskeratosis was recorded for 13 adult tortoises. Clinical symptoms were not observed on any of the 69 subadult tortoises encountered (i.e., although the number in burrows that could not be observed has not been determined). One can see that all 13 of the tortoises were adults. Nine exhibited suspected signs of URTD, and four were identified as having cutaneous dyskeratosis (see footnote). Eight males (89%) and one female (11%) had URTD-like symptoms, and one male (25%) and three females (75%) appeared to have cutaneous dyskeratosis.

The spatial distribution for 12 of these 13 tortoises reveals that they were not clustered in any given region. Two were found south of Highway 58 in the Fremont-Kramer DWMA; four in the Superior-Cronese DWMA; two in the Ord-Rodman DWMA; and four outside DWMAs. Seven were inside or within a mile of higher tortoise concentration areas, and five were in lower concentration areas[13].

Six of the 12 tortoises (50%) observed with disease-like symptoms were inside or adjacent to newer tortoise die-off regions discussed below. Two of these six tortoises are proximate to recent die-off regions in the Fremont-Kramer DWMA south of Highway 58 (i.e., two with cutaneous dyskeratosis), and the other four (i.e., all with URTD-like symptoms) are proximate to newer die-off areas throughout the Superior-Cronese DWMAs.

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13 Sample sizes are too small to conclude how prevalent disease may be in the population. Nor are disease symptoms easily observed on all tortoises encountered, although the timing of surveys facilitates observations for clinical signs. Thus, 156 (72%) of the 216 tortoises encountered in the spring during distance sampling could be observed, compared to only 90 (33%) of 275 animals observed during sign count surveys in the summer-fall. The main difference appears to be the prevalence of tortoises in burrows that could not be observed in the summer-fall, compared to above-ground animals found during the spring, which were more readily observed. Even in the spring, 60 animals could not be clearly observed, likely because they withdrew into their shells before the surveyor could get a good look at them.

Dr. Francesco Origgi (pers. comm., Nov 2002) has found that herpesvirus lesions in tortoises may only be visible for about a 72-hour period, after which time the lesions disappear. Origgi's work has shown that the animal may be infected with no obvious clinical signs. This is also true for both clinical signs and laboratory assays (i.e., ELISA tests) of URTD-infected tortoises. Tortoises that have clinical signs or test positive for exposure to mycoplasma on one occasion are asymptomatic and test negative on subsequent occasions. Therefore, it would be misleading to draw conclusions about the prevalence or distribution of disease in the West Mojave population based solely on these data

3.3.2.5.3 Older and Newer Die-off Regions

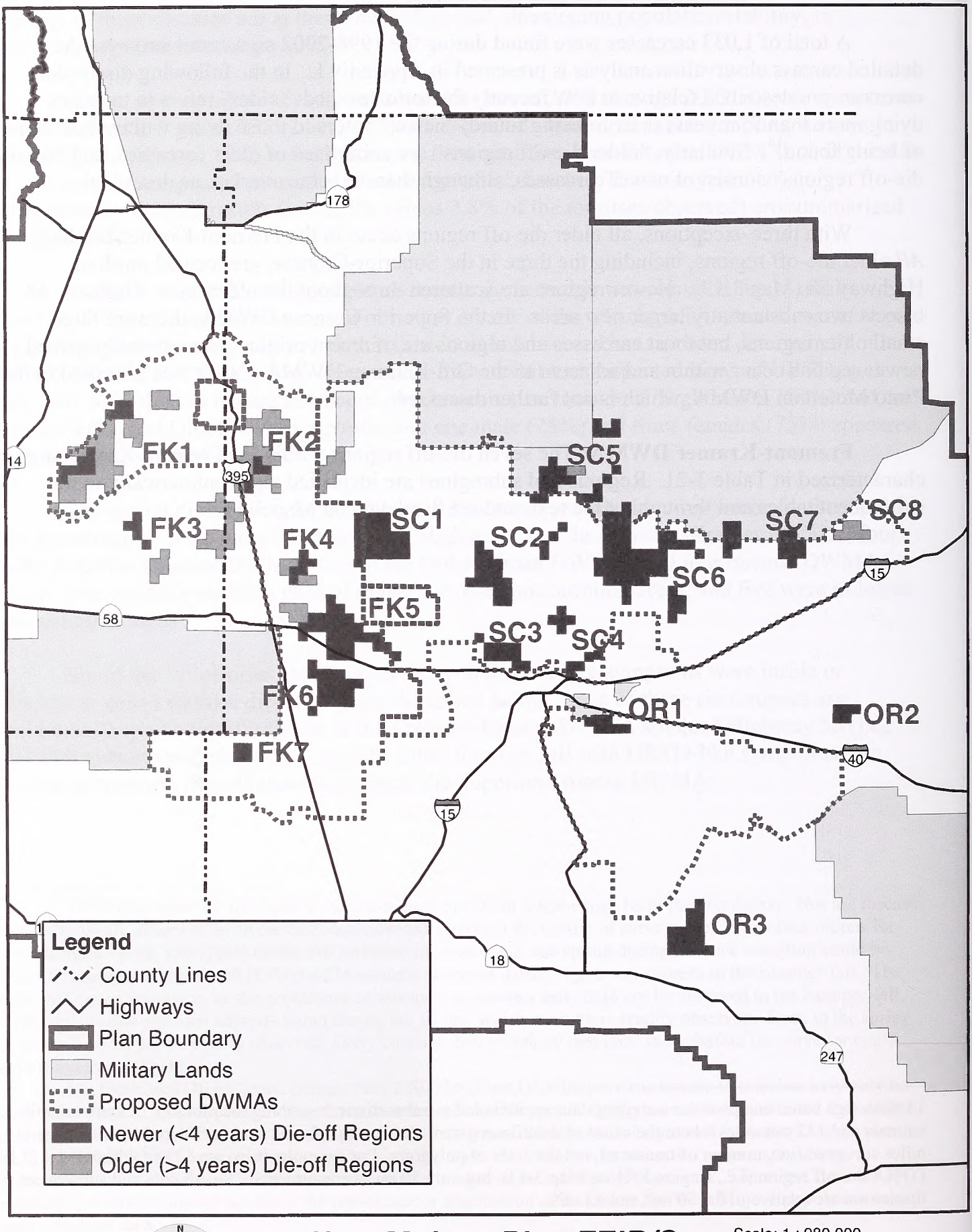
A total of 1,033 carcasses were found during the 1998-2002 sign count surveys. A detailed carcass observation analysis is presented in Appendix L. In the following discussion, carcasses are described relative to how recently the tortoises died: "older" refers to tortoises dying more than four years prior to being found; "newer" refers to those dying within four years of being found[14]. Similarly, "older die-off regions" are comprised of older carcasses, and "newer die-off regions" consist of newer carcasses, although there is some overlap, as described.

With three exceptions, all older die-off regions occur in the Fremont-Kramer DWMA. *All* older die-off regions, including the three in the Superior-Cronese, are located north of Highway 58 (Map 3-13). Newer regions are scattered throughout the older ones. Highway 58 bisects two substantially larger new areas. In the Superior-Cronese DWMA, there are three small older regions, but most carcasses and regions are of recent origin. Three broadly spaced newer regions occur within and adjacent to the Ord-Rodman DWMA. None was observed in the Pinto Mountain DWMA, which is not further discussed.

Fremont-Kramer DWMA: The seven die-off regions within the Fremont-Kramer are characterized in Table 3-21. Regions and subregions are identified alpha-numerically in the subsequent tables and throughout the text, and are displayed on Map 3-13.

14 Both sign count and distance sampling data are included in subsections describing locations of 12 symptomatic animals and 142 carcasses where the cause of death was given. As in other places, summaries include only square miles surveyed (i.e., number of transects), not the sizes of polygons. For example, there are 63 mi^2 within the DTNA die-off region (i.e., Region FK1 on Map 3-13), but only 50 mi^2 were surveyed. So, all data and subsequent discussion are relative to the 50 mi^2, not 63 mi^2.

Tortoise Die-off Regions



West Mojave Plan FEIR/S
Map 3-13

Scale: 1 : 980,000
0 10 20 30 Km
0 10 20 30 Miles

8/13/04

Table 3-21
Characteristics of Older and Newer Die-Off Regions
In the Fremont-Kramer DWMA

REGION NO. & NAME	AGE OF DIE-OFF	NO. MI^2	NO. CARCASSES	RANGE	AVERAGE
OLDER REGIONS NORTH OF HIGHWAY 58					
FK1. DTNA	**Older**	**50**	**72**	**1 to 5**	**2.7**
	Newer	13	30	1 to 5	1.8
Subtotal		*63*	*102*		*2.0*
FK2. Cuddeback Lake	**Older**	**36**	**53**	**1 to 4**	**2.2**
	Newer	5	11	1 to 4	1.8
Subtotal		*41*	*64*		*1.9*
FK3. California City	**Older**	**22**	**21**	**1 to 3**	**1.4**
	Newer	5	5	1 to 2	1.3
Subtotal		*27*	*26*		*1.4*
FK4. NE Kramer Jct.	**Older**	**15**	**24**	**1 to 4**	**1.4**
	Newer	6	7	1 to 2	2.2
Subtotal		*21*	*31*		*1.9*
TOTALS	**Older**	**123 (81%)**	**170 (76%)**	**1 to 3/1 to 5**	**1.8**
	Newer	29 (19%)	53 (24%)	1 to 2/1 to 5	2.1
	4 Areas	**152 mi^2**	**223**	**1 to 2/1 to 5**	**1.9**
NEWER REGION BISECTED BY AND SOUTH OF HIGHWAY 58					
FK5. N of HWY 58 bisect	Newer	32	37	1 to 4	1.7
FK6. S of HWY 58 bisect	Newer	19	26	1 to 5	1.4
FK7. Edwards Bowl	Newer	4	4	1	1.0
TOTALS	**Newer**	**45 mi^2**	**67**	**1/1 to 5**	**1.4**
	Older	**0 (0%)**	0 (0%)	N/A	N/A
	3 Areas	**45 (100%)**	**67 (100%)**	**1 to 5**	**1.5**

Observations: Older regions north of Highway 58 comprised 123 mi^2 (81%) of the 152 mi^2 die-off region, with 29 mi^2 (21%) of newer die-offs interspersed. Of the 223 carcasses found, 170 (76%) were older and 53 (24%) were newer, with at least one and up to five carcasses found on each square mile surveyed. There were also two newer regions in the Fremont-Kramer, which are bisected by Highway 58 (Region FK5 and Region FK6 on Map 3-13). Region FK7 is 4 mi^2 and found near "Edwards Bowl." Only 1 tortoise/mi^2 was observed, so this is more likely an artifact of the survey as opposed to a regional die-off. The two bisected regions included 32 mi^2 in Region FK5 and 19 mi^2 in Region FK6. There were 37 fresher carcasses north of the highway and 26 to the south; given the similar region sizes, the average number of carcasses per transect was similar (i.e, 1.7/mi^2 to the north and 1.4/mi^2 to the south). Like the older regions to the north, there were between 1 and 5 carcasses found per transect. Unlike the older regions, 54 of 67 carcasses (81%) found in these two areas were estimated to have died within four years of being found.

Given the above observations, areas north of Highway 58, excluding Region FK5, are predominantly (81%) older die-off regions. Region FK5 and south of Highway 58 are (100%) newer die-off regions.

BLM Study Plots: Five of Dr. Berry's permanent study plots are found in the Fremont-Kramer DWMA, north of Highway 58. The three plots at the DTNA and one in Fremont Valley are within or adjacent to Region FK1 (see Map 3-13). The Fremont Peak study plot is in the vicinity of Region FK2. Declines included 93% at Fremont Peak, 91% at DTNA Interior, 84% at DTNA Exterior Interpretive Center, 74% at DTNA Interior Interpretive Center, and 72% at Fremont Valley.

These data support Dr. Berry's conclusions that the precipitous declines observed on the five square miles encompassing these study plots occurred throughout the northern and northwestern portions of the Fremont-Kramer DWMA. Two older die-off regions (i.e., Regions FK3 and FK4) are about seven miles southwest and eight miles south, respectively, of the Fremont Peak study plot. As such, Dr. Berry's documented die-offs in the DTNA, Fremont Valley, and Fremont Peak identified a smaller region, within a substantially larger one, where tortoises died between the mid-1980's and present day.

Distribution of Symptomatic Tortoises: Four of the 12 (33%) tortoises with disease symptoms were found in or in the vicinity of the Fremont-Kramer DWMA (Map 3-13). The two identified with cutaneous dyskeratosis were within and immediately adjacent to Region FK6, the newer die-off region south of Highway 58. One with URTD-like symptoms was found three miles northwest of Region FK7; the other was two miles southwest of Region FK3. Three of the four were within higher concentration areas; the fourth was three miles southwest of the *only* higher density area west of Highway 395.

Superior-Cronese DWMA: Given Dr. Berry's work and other observations, the die-off in the northern and northwestern Fremont-Kramer DWMA was already suspected, although the affected area is larger than expected. The die-offs in the Superior-Cronese have been suspected since 1998, when sign count data were first collected; however, this is the first documentation of the spatial distribution of these die-offs.

The recent die-off regions described herein in the Superior-Cronese are alarming new evidence that the entire population within this 980 mi^2 DWMA may be in jeopardy of becoming extinct (i.e., disappearing) within the next 20 years (see discussion below).

The eight die-off regions within the Superior-Cronese are characterized in Table 3-22 (see also Map 3-13).

Table 3-22
Characteristics of Older and Newer Die-Off Regions in the Superior-Cronese DWMA

REGION NO. & NAME	AGE OF DIE-OFF	NO. MI^2	NO. CARCASSES	RANGE	AVERAGE (Carc/mi^2)
SC1. N of Harper	Newer	27	24	1 to 4	1.8
SC2. Coolgardie Mesa	Newer	22	24	1 to 4	1.8
SC3. Hinkley	Newer	11	13	1 to 3	1.2
SC4. N of Barstow	Newer	10	13	1 to 2	1.3
Subtotal	*4 Newer*	*70*	*79*	*1 to 4*	*1.2*
SC5. E Superior Valley/ Goldstone	Newer	23	35	1 to 4	1.5
	Older	5	8	1 to 3	1.6
Subtotal	*1 Older/1 Newer*	*28*	*43*	*1 to 4*	*1.6*
SC6. Coyote Corner/ Paradise Valley	Newer	56	99	1 to 8	1.8
	Older	7	26	1 to 8	3.7
SC7. Alvord Slope	Newer	16	27	1 to 5	1.7
SC8. Cronese Lakes	Older	6	8	1 to 3	1.3
TOTALS	**Older**	**18 (10%)**	**42 (15%)**	**1 to 8**	**2.2**
	Newer	**165 (90%)**	**240 (85%)**	**1 to 8**	**1.4**

Observations: The three older die-off subregions were all relatively small (i.e., between 5 mi^2 and 7 mi^2), encompassed 18 mi^2, where 42 (15% of 282) carcasses found had died more than four years ago[15]. The seven older die-off subregions were all relatively large (i.e., between 10 mi^2 and 56 mi^2), encompassed 165 mi^2, where 240 (85% of 282) tortoises had died within four years of being found. As such, both older and newer die-off regions encompassed about 19% (183 mi^2 of 980 mi^2) of the Superior-Cronese DWMA. Whereas 19% may seem like an insignificant amount of land for this large, 980 mi^2 area, the spatial distribution (Map 3-13) was throughout the DWMA north of Highway 58, and all higher density live tortoise areas were proximate.

Only 18 mi^2 (10%) of the Superior-Cronese were indicative of older die-off regions. All carcasses in the remaining 165 mi^2 (90%) had died within four years of being found. Region SC8 was the only older region not associated with a more recent die-off. The other two older regions (i.e., SC5 and SC6) were encompassed within predominantly recent die-off areas. Unlike the Fremont-Kramer, which is characterized as an older die-off region (170 of 223 carcasses, or 76%), *the Superior-Cronese is a region of predominantly newer die-offs* (i.e., 240 of 282 carcasses, or 85%), where most observed tortoises had died since about 1990.

BLM Study Plots: None of the nine permanent study plots is within the Superior-Cronese DWMA (i.e. six are within the Fremont-Kramer and three are within or adjacent to the Ord-Rodman DWMA). Had plots been established in the Superior-Cronese, there may have been an opportunity to detect these recent die-offs earlier, as Dr. Berry had done in the Fremont-Kramer DWMA. Establishing study plots in remaining portions of higher density tortoise areas may be prudent to detect die-offs as they occur, rather than after the fact.

[15] Time since death is only a relative indicator. Taken literally, it would mean that the tortoises died between 1994 and 1997, relative to the survey dates of 1998 and 2001. It is a safer assumption that these tortoises died sometime after 1990.

Distribution of Symptomatic Tortoises: Four of the 12 (33%) tortoises with disease symptoms were found in the Superior-Cronese DWMA (Map 3-13). One was southeast of Cuddeback Lake, two were found in the Mud Hills area, and one was found in the northeast corner of Coolgardie Mesa. All four were within several miles of recent die-off regions. Three of the four were inside or within one mile of higher density tortoise areas.

Ord-Rodman DWMA: Although three newer die-off subregions are described in this section as being in the Ord-Rodman DWMA, only Region OR1 (5 mi^2) was actually found within the DWMA (Map 3-13). Region OR2 (7 mi^2) was found north of Interstate 40 and east of Troy Dry Lake, and OR3 (15mi^2) was found in the western part of the Johnson Valley Open Area. Pertinent data are summarized in Table 3-23.

Table 3-23
Characteristics of Older and Newer Die-Off Regions in the Ord-Rodman DWMA

REGION NO. & NAME	AGE OF DIE-OFF	NO. MI^2	NO. CARCASSES	RANGE	AVERAGE (Carc/mi^2)
OR1.	Newer	5	9	1 to 3	1.8
OR2.	Newer	7	4	1	0.6
OR3.	Newer	18	15	1 to 2	0.8
TOTALS		**30**	**28**	**1 to 3**	**1.1**

Observations: The three newer die-off subregions were between 5 mi^2 and 18mi^2, encompassing a total of 30 mi^2. Only 28 newer carcasses were found, with about half of these (i.e., 15 of 28, or 54%) located in the Johnson Valley Open Area. Region OR1 is the most significant, as it may indicate that ill tortoises have passed through the "corridor" from north to south (see "corridor" on Map 3-13). If this 5 mi^2 die-off area represents a contact zone for URTD or some other disease spread, it may have the potential to threaten tortoise populations on the north-facing bajada between Dagget Ridge/Newberry Mountain and Interstate 40, where 19 mi^2 of higher sign counts were found between 1998 and 2002.

BLM Study Plots: There are three permanent study plots within and adjacent to the Ord-Rodman DMWA; the Stoddard Valley plot in the northwestern part of the DWMA and Lucerne Valley plot to the south; the Johnson Valley plot is found in the open area, to the east of the DWMA. Both the Stoddard Valley and Lucerne Valley plots are within higher density tortoise areas. Interestingly, there was only a 5% decline on the Stoddard Valley plot (i.e., from 86 to 81 tortoises/mi^2 between 1981 and 1991) and a 30% decline on the Lucerne Valley plot (i.e., 93 to 65 tortoises/mi^2 between 1980 and 1994). For comparison, there was a 77% decline (i.e., 69 to 16 tortoises/mi2 between 1980 and 1994), which is not associated with a higher concentration area. These findings further support Dr. Berry's findings that tortoise trends on the individual three square miles appear to represent tortoise trends for the three regions where the plots were located.

Distribution of Symptomatic Tortoises: Four of the 12 (33%) tortoises with disease symptoms were found within or adjacent to the Ord-Rodman DWMA (Map 3-13). Two of these were within the DWMA, including one of the three observed with suspected evidence of cutaneous dyskeratosis. One URTD-symptomatic tortoise was observed in the eastern portions

of the Johnson Valley Open Area, and the fourth animal was observed about seven miles south of the open area. Two were within higher sign count areas, and the other two were within two to three linear miles. None was within recent die-off areas; the closest was in the southern portion of the Ord-Rodman DWMA, approximately three miles northwest of the nearest die-off region.

Summary of All Carcass Observations: Table L-11 (see Appendix L) summarizes the cumulative findings listed above. Region-wide, there were of 420 mi^2 of die-offs, including 279 mi^2 (66%) of newer die-offs and 141 mi^2 (34%) of older die-offs; given the overlap of 29 mi^2, there were a total of 391 mi^2 affected by both newer and older die-offs. This indicates that about 3.5% of the 2002 tortoise range (391 of 11,134 mi^2), or 11.6% of the surveyed area (391 of 3,362 mi^2), were within older and newer die-off regions.

A total of 600 carcasses were found within the die-off regions (59% of the 1,011carcasses where coordinate information was available), including 388 (65%) newer carcasses and 212 (35%) older carcasses. This is a significant finding, indicating that tortoises are continuing to die throughout the planning area, particularly in the Superior-Cronese DWMA, probably since about 1990. Newer die-off regions were characterized by 317 (85%) newer carcasses and 54 (15%) older carcasses; older die-off regions were characterized by 158 (69%) older carcasses and 71 (31%) newer carcasses. These latter findings suggest that tortoises continue to die in older die-off regions, even though older carcasses were twice as likely to be found as newer ones.

3.3.2.6 Tortoises and Off Highway Vehicles

One of the most controversial resource management issues within the western Mojave Desert concerns the relationship between desert tortoises and off-highway motorized vehicles. This discussion will address both casual OHV use and competitive events and the effects that both may, or may not, have on tortoises and habitat.

3.3.2.6.1 Dispersed Casual OHV Use

Off highway vehicles users visit the desert for many purposes. They explore the desert, hunt, and drive to campsites and trailheads for hiking or horseback riding, rockhounding and other activities. Commercial uses are also common, for mineral exploration, maintenance of existing facilities, and administrative or law enforcement purposes. This use occurs in a more dispersed manner than, for example, concentrated competitive events, and results in a low-density but continuing presence of vehicles throughout the desert. The following discussion addresses effects that have occurred as a consequence of such dispersed, casual use of the planning area by off highway vehicles.

Boarman (2002) conducted a literature review of 56 references that addressed OHV-based impacts on desert tortoises. His conclusion follows:

> Although each study comparing tortoise densities inside and outside of [OHV] areas has limitations, they all lend evidence to reductions in tortoise population densities in heavy [OHV] use areas. The causes for these declines are less certain. Tortoises and their burrows are crushed by [OHVs], although it is difficult to evaluate the full impact this activity currently has on tortoise

> populations, partly because there are probably relatively few tortoises in most open use areas. [OHVs] damage and destroy vegetation. Density, cover, and biomass are all reduced inside versus outside of [OHV] use areas, particularly following multiple passes by vehicles. Split grass (*Schismus barbatus*), a weedy introduced grass, in particular appears to benefit from [OHV] activity. Very light, basically non-repeated, vehicle use probably has relatively little long-term impact. Soil becomes compacted by vehicles. The compaction increases with moisture content of the soil, weight of vehicle (particularly high weight to tire surface area ratio), and soil type. Cohesionless sand, such as in sand dunes and washes, [is] largely immune to compaction while moist soils are much more susceptible than dry ones. Compaction, lower infiltration rates, loss of plants and cryptogamic soils all contribute to increased wind and water erosion and fugitive dust, particularly when such areas are several meters in width. More research is needed to understand the effect light [OHV] use has on tortoise populations and habitat.

Boarman (2002) reported that tortoise densities have been reduced through (a) *direct effects*, including crushing of tortoises and burrows, and (b) *indirect effects* of (i) compaction of soil, (ii) destruction of cryptogamic soils, (iii) changes in vegetation, (iv) erosion and loss of soil, (v) light OHV use, and (vi) human access to tortoise habitat.

The USFWS (2002) indicated that the degree of threat posed to desert tortoises by recreation increases with the speed, weight, and numbers of recreational units involved. They indicated, for example, that a small group of hikers posed much less threat to the desert tortoise and its habitat than a race that involved numerous all-terrain vehicles.

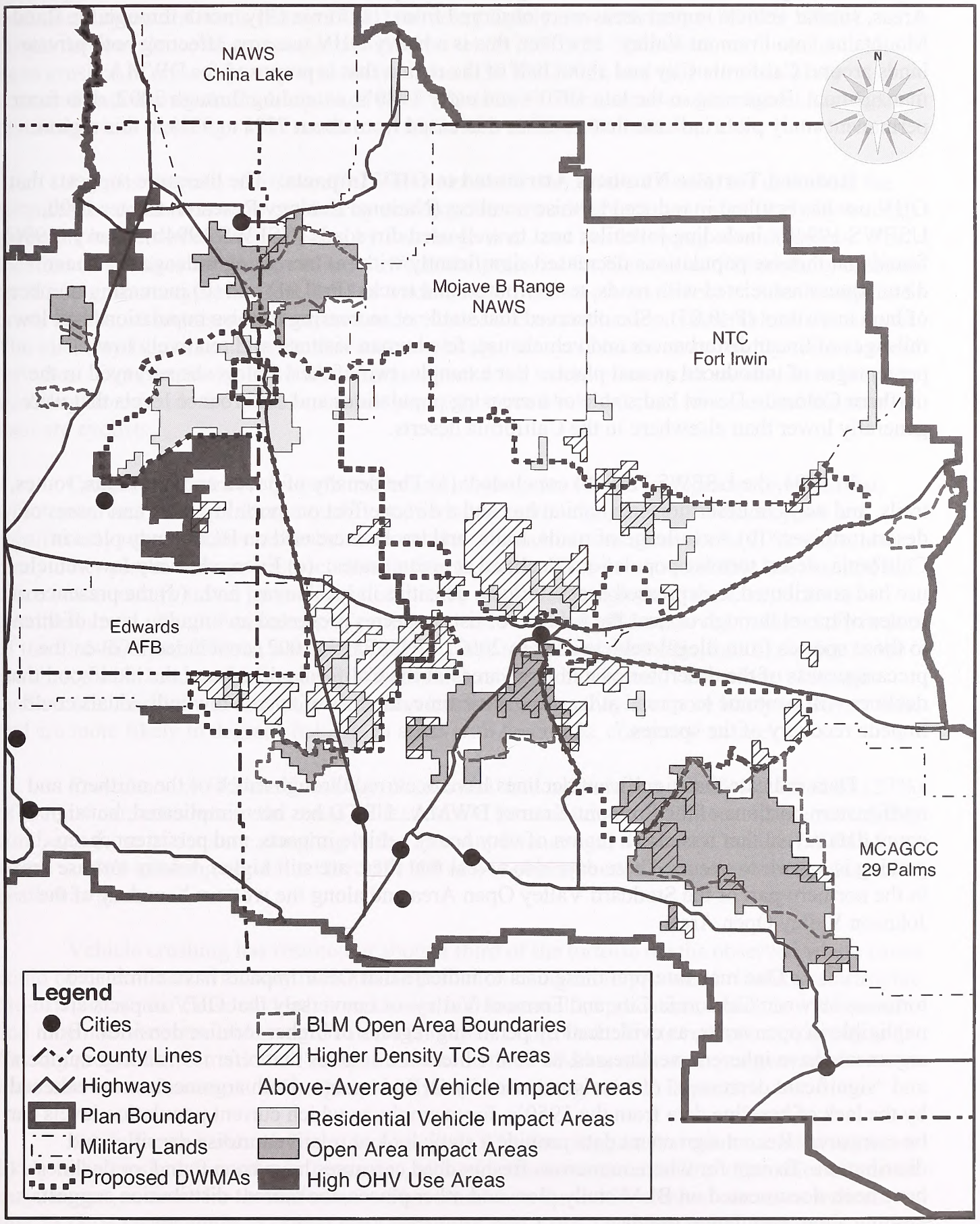
Positive Benefits of Motorized Vehicle Routes: Haskell (2000) reported that roads provided benefits to society such as opportunities for recreation and natural resource extraction. The USFWS (2002) felt that recreational use of the desert might benefit the desert tortoise in an indirect manner. They concluded that many people viewed the California desert as a unique place to enjoy nature and solitude, and that the enjoyment of the desert could promote private citizens to assist in volunteer projects to restore habitats, clean up trash, report problems to the BLM, and educate other users. The BLM's existing educational programs were identified as striving for these goals (USFWS 2002).

3.3.2.6.2 Direct Impacts of OHVs on Desert Tortoise Populations

As of 1980, the USFWS (2002) reported that OHV activities had affected approximately 25% of desert tortoise habitat in California. In 1986, Dodd (1986) concluded that nearly 70% of the remaining high-density tortoise populations in the California desert were subject to OHV impacts. In 1990, Chambers Group, Inc. (1990) found that 413 square miles (2.9%) of the planning area had been directly disturbed by OHVs, and that much of the disturbance had occurred in open areas or in unauthorized OHV-use areas.

Sign count data collected between 1998 and 2002 indicate that vehicle-based impacts are prevalent throughout tortoise habitats, including DWMAs. Within the Fremont-Kramer and Superior-Cronese DWMAs, cross-country travel was observed on 833 of 1,572 (53%) transects and roads were observed on 702 (45%) transects. There were 447 mi^2 with higher tortoise sign counts, 159 mi^2 (36%) of which overlapped with above-average vehicle-based impacts (see Map 3-14).

Distribution of Recreational and Residential Vehicle Impact Regions (1998-2002)



West Mojave Plan FEIR/S
Map 3-14

Scale: 1 : 1,100,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Although most of the above-average vehicle impacts are contained within BLM Open Areas, similar vehicle impact areas were observed from California City, north through the Rand Mountains, into Fremont Valley. In effect, this is a heavy OHV use area affecting both private lands around California City and about half of the region that is proposed for DWMA management. Beginning in the late 1970's and early 1980's, extending through 2002, data from permanent study plots indicate that tortoises decreased from about 72% to 93% in this region.

Reduced Tortoise Numbers Attributed to OHV Impacts: The literature suggests that OHV use has resulted in reduced tortoise numbers (National Ecology Research Center 1990, USFWS 1994b), including juveniles next to well-used dirt roads (USFWS 1994b). Berry (1996) found that tortoise populations decreased significantly with (a) increasing mileages of linear disturbances associated with roads, trails, routes, and tracks ($P<0.01$) and (b) increasing numbers of human visitors ($P<0.05$). She observed that stable or increasing tortoise populations had low mileages of linear disturbances and vehicle use, few human visitors, and relatively low percentages of introduced annual plants. For example, two of the 15 plots she surveyed in the northern Colorado Desert had stable or increasing populations and disturbance levels that were generally lower than elsewhere in the California deserts.

In 1994, the USFWS (1994b) concluded: (a) The density of paved and dirt roads, routes, trails, and ways in desert tortoise habitat has had a direct effect on mortality rates and losses of desert tortoises; (b) As mileage of roads, trails, and tracks increased on BLM study plots in California, desert tortoise populations declined at greater rates; (c) Even relatively low vehicle use had contributed to depressed desert tortoise densities in local areas; and, (d) the presence of routes of travel through or near the habitats of listed species presented an ongoing level of threat to those species from illegal vehicle use. In 2002, the USFWS (2002) concluded, "Given the precariousness of the desert tortoise in large areas of the California desert and the likelihood that declines will continue to spread at least for some time, the loss of even a few individuals could impede recovery of the species."

Data indicate that significant declines have occurred through much of the northern and northeastern portions of the Fremont-Kramer DWMA. URTD has been implicated, but sign count data reveal that it is also a region of very heavy vehicle impacts, and persistent sheep grazing is known to occur. These data also reveal that there are still higher density tortoise areas in the northern part of the Stoddard Valley Open Area and along the western boundary of the Johnson Valley Open Area.

One may interpret these data to indicate that OHV impacts have eliminated tortoises between California City and Fremont Valley, or conversely that OHV impacts are negligible in open areas, as evidenced by persisting regions of higher tortoise densities. Both arguments have inherent weaknesses, as do the literature sources that refer to "reduced numbers" and "significant decreases" of tortoises caused by OHV impacts. Both arguments are weakened by the lack of baseline data from the 1950's, for example, to which current population levels can be compared. Recent sign count data provide a static look at relative tortoise densities and distribution. Except for where numerous freshly dead carcasses have been found, or declines have been documented on BLM study plots and other places, the current distribution suggests nothing about population trends.

Tortoises and Burrows Crushed: Vehicle collisions are responsible for tortoise injury and mortality on dirt roads (Berry 1996), including lightly traveled roads (USFWS 1994b). Given the prevalence of cross-country OHV travel (WMP 1998-2002 data), tortoises have also been crushed in areas adjacent to roads (see also USFWS 2002), and mortality has likely occurred both above- and belowground (USFWS 1994b). Such cross-country travel has also resulted in loss (Jennings 1993) or damage (USFWS 1994b) of tortoise burrows.

Relative Impacts Attributed To Trucks versus Motorcycles: Data do not indicate if the tortoises (or carcasses) were crushed by motorcycles or trucks, but it was more likely by trucks, given the larger surface area affected by four large tires, and the following considerations. The location of tortoises and burrows likely affects the potential for them to be differentially crushed by trucks or motorcycles. Compared to trucks, motorcyclists are less likely to ride through and crush shrubs, so tortoises and burrows under shrubs are somewhat less vulnerable to this impact. The visibility from a motorcycle also makes it likely that cyclists can more readily see and avoid tortoises. Comparatively, operators of four-wheel drive trucks often crush shrubs, have limited visibility from inside the vehicle, and are probably more likely to crush tortoises and burrows than are cyclists.

Cross-country travel by both trucks and motorcycles results in degradation of habitat, which may result in poor forage quality and reduced burrowing potential. Motorcycles are significantly more maneuverable between shrubs, in mountainous areas above 20% slope, and many other places that are less accommodating to trucks. This maneuverability has resulted in more cross-country travel by motorcycles than by trucks, although there are exceptions in localized areas. The 27% increase of trails between 1979 and 1995 observed in the southern part of the Ord-Rodman DWMA was predominantly due to motorcycle traffic, and likely due to the proximity with Johnson Valley Open Area, which is immediately east. Therefore, although cyclists are less likely to crush tortoises than truck operators, they are more likely to leave roads, and are more likely to degrade habitats in areas with few roads, compared to trucks.

Prevalence of Vehicle Crushing: Sign count data indicate that vehicles crushed 28 (27%) of the 104 carcasses where the cause of death could be ascertained. These results are remarkably similar to those of distance sampling in the Fremont-Kramer and Superior-Cronese DWMAs, where vehicle crushing accounted for 32% (14 of 44) of all observed carcasses where cause of death was given.

Vehicle crushing has resulted in about a third of the tortoise deaths observed where cause could be determined, with only mammalian predation being more prevalent. Unlike catastrophic die-offs, where the cause of death is unknown, and mammalian predation, which is widespread and may not be controllable, vehicle impacts may be controlled. Route reductions, signing and fencing programs, restriction on competitive events in DWMAs, education program, and increased law enforcement are pragmatic ways of minimizing vehicle impacts.

Adult Versus Subadult Tortoises Crushed: The data suggest that adult tortoises are more likely to be crushed than subadult tortoises, although the lower detectability of smaller carcasses may, in part, account for the difference. Sign count data for the 28 crushed carcasses indicate that 23 (82%) were adults, 4 (14%) were subadults, and 1 (4%) was unknown. Similarly,

distance-sampling data indicate that 12 of the 14 (86%) crushed carcasses were of adult tortoises, 1 (7%) was a subadult, and 1 (7%) was unknown.

Aboveground Tortoise Activity in Response to Wet versus Dry Years: Sign count and distance-sampling data indicated within a give year, tortoises are more likely to be aboveground (i.e., active) in the spring and in burrows (i.e., inactive) in the summer-fall. The distance sampling data suggest that increased activity patterns occur on a *regional* scale, not just on a *local* scale. This may the first evidence that increased tortoise activity patterns in response to rainfall occur on a population level instead of at the individual level.

These observations are significant for the following reasons:

- Heightened activity in wetter years may put more tortoises at risk to being crushed by vehicles, both on and adjacent to designated routes. This impact is more likely to occur in higher density areas where operators are more likely to encounter tortoises.

- Illegal activities that are facilitated by roads (i.e., poaching, pet collection, inter-regional translocations, intentional vandalism, etc.), may occur more frequently in wetter years, given that tortoises are substantially more visible aboveground than in burrows. Increased law enforcement in higher density areas during such conditions may minimize these impacts when and where they are most likely to occur.

- Vehicles traveling in washes in wetter years may impact relatively more tortoises than in dry years. It has been suggested that vehicle travel in washes during drought periods would result in more impacts. This may not be true if tortoise activity in washes occurs at reduced levels (i.e., although tortoises in burrows would still be affected by vehicle travel in washes).

Locations of Tortoises: There were 491 sign count and distance sampling tortoises observed between 1998 and 2002. Their locations and other information are given in Table 3-24. Distance sampling tortoises for 2001 and 2002 are given in the middle two rows of the table. Arrows show the directions to which percentages apply; the two middle rows are relative to "Distance Both Years" shown in the fourth row of data.

Table 3-24
Characteristics of 491 Tortoises Found Between 1998 and 2002

LOCATIONS OF TORTOISES[16]										
		288 IN BURROWS					203 ABOVEGROUND			
Type Years	Total	No Obs	Shrubs Rocks	Open	Wash Banks	Unk	No Obs	Open	Shrubs Rocks	Washes
Sign Count 98-99-01	275 ↓56%	202 ←74 ↓70%	116 ←57%	58 ←29%	20 ←10%	8 ←4%	73 ←26% ↓36%	67 ←92% ↓40%	3 ←4% ↓9%	3 ←4% ↓4%
Distance 2001	104 ↓21%	29 ←28% ↓10%	29 in Burrows; no location data				75 ←72% ↓37%	58 ←77% ↓34%	17 ←23% ↓37%	See footnote
Distance 2002	112 ↓23%	57 ←51% ↓20	57 in Burrows; no location data				55 ←49% ↓27%	43 ←78% ↓26%	12 ←22% ↓37%	
Distance Both Years	216 ↓44%	86 ←40% ↓30%	86 in both years				130 ←60% ↓64%	101 ←78% ↓60%	29 ←22% ↓91%	
Total	491	288 ←59%					203 ←41%	168 ←84%	32 ←16%	

OHV Impacts to Tortoises in Washes: During his studies at the Desert Tortoise Natural Area in the early 1990's, Jennings (1993, 1997a, 1997b) found that tortoises systematically located preferred forage along the margins of small washes. They spent a considerable amount of time traveling along washes, and apparently used washes as navigational aids to relocate burrows. For example, more than 25 percent of all plants on which tortoises fed, and three of the ten most-preferred plants, were in the washes and washlets, even though washes comprised only 10.3% of the study area habitats (1997). Given this information, he concluded that OHV use may disorient tortoises (1993) and that tortoises will be forced to select other less-preferred and possibly less-nutritious plant species (1997a).

Jennings (1997a) also found that tortoises generally spent more time traveling and foraging in hills, washes, and washlets than on the flats, and that hills and washes were favored in the planning area for use by OHV recreationists. Given this overlap, he concluded that tortoises are more likely to suffer direct mortality from vehicles than if they used the habitat randomly.

3.3.2.6.3 Direct Impacts of OHVs on Desert Tortoise Habitat

Habitat Degradation: Lovich and Bainbridge (1999) found that the wheel tracks of a full-size OHV vehicle operating in an undisturbed area could damage almost 1.25 acres (0.5 ha) with every 4 miles (6.44 km) traveled. Goodlett and Goodlett (1991) reported that impacts in the

[16] Sign count data are shown in the 1st row for 275 tortoises, and in the 4th row for 216 distance-sampling tortoises 86 animals found in burrows during distance sampling, but was provided for aboveground tortoises. The total aboveground estimates of 84% in the open and 16% under shrubs are for 200 tortoises observed outside washes. It would be incorrect to conclude that only 3 of 203 tortoises were in washes; the correct conclusion is that 3 of 73 (4%) were found in washes, in the summer to fall period; even this number is likely an underestimate, as surveyors likely failed to indicate all tortoises and burrows associated with washes.

Rand Mountain area were highest close to open routes. Open routes may induce negative impacts for substantial distances; even at 500-feet from an open route, unauthorized tracks were observed at a rate of almost one per 20 linear foot.

Negative effects on the desert environment have been summarized (National Ecology Research Center 1990, USFWS 1994b). Impacts include damage to and loss of habitat (Jennings 1997a, USFWS 2002) and severe declines in biomass of plants and vertebrates (USFWS 1994b). Both annual and perennial plants are affected (Jennings 1997a, National Ecology Research Center 1990), which in turn affect forage quality, water availability, and thermoregulation (USFWS 1994b).

Vollmer *et al.* (1976) reported that cross-country OHV travel impaired annual plant productivity, retarded shrub regrowth, resulted in less plant cover and density, and conspicuously decreased shrub biomass. In comparing areas of different disturbance levels, Webb *et al.* (1983) concluded that light OHV use might not cause the severity of impact that occurs in some ghost towns, but OHV pit areas have more soil and vegetation disruption than naturally recovering ghost towns. Berry (1996) indicated that OHV use directly affects plants and animals by disrupting the distribution, composition, structure, diversity, and biomass of animal and plant communities; changing the watershed; and promoting desertification.

The USFWS (2002) concluded that unauthorized activities, particularly OHV use, have degraded desert tortoise habitat. The access provided by the BLM for legitimate uses, such as recreation, facilitates some degree of unauthorized use (USFWS 2002). In addition to unauthorized roads and trails, areas that are frequently used for loading and unloading vehicles can be severely degraded (USFWS 2002).

Habitat Regeneration: Vollmer *et al.* (1976), upon revisiting their study plot 18 months after the tests were conducted, found that little damage to shrubs was apparent from a distance, but that when viewed from nearby, tracks were clearly discernible. They concluded that truck tracks can persist at least 10 to 12 years depending on the substrate, and that shrub cover may be re-established within a couple of decades if there is no further damage. National Ecology Research Center (1990) estimated full-recovery time required to ameliorate severe OHV impacts should probably be estimated in terms of human life spans; and that hundreds or thousands of years may be necessary for disturbed areas to recover. Stowe (1988) found that many of the older, smaller trails that were identified 1977-78 appeared to be unused in 1988, and in some cases the vegetation appeared to be growing back over the edges of the trails.

OHV Impacts to Wash Habitats: Jennings (1993, 1997a) found that vehicles' driving in washes disturbed relatively rare species of plants that were restricted to washes. LaRue (1997) found catclaw acacia and desert willow mostly restricted to washes in the Ord Mountain area. Damage observed in the Ord Mountains included disturbed soil and terrain, crushed shrubs, and eroded margins of washes, which led to widening of the washes. He found that some routes in washes became impassable when banks and boulders were encountered, which necessitated turning around and resulted in new shrub damage.

OHV Impacts to Soils: OHV use has resulted in the following impacts to soils (see also National Ecology Research Center 1990): damage or destruction of soil crusts (24), soil erosion (Trombulak and Frissell 2000, USFWS 1994b), and interrupted run-off patterns (Trombulak and Frissell 2000). Vollmer *et al.* (1976) found that OHV use changed soil compaction and permeability, and that disruption of soils may not be fully expressed until years after the original impact. Berry (1996) found alterations to and erosion (wind, water) of soil and soil crusts, and adverse effects to soil porosity, chemistry, moisture, and temperature. Lovich and Bainbridge (1999) observed that areas they considered least susceptible to water and wind erosion, following OHV use, were dunes, playas, and areas with abundant coarse surface material.

3.3.2.6.4 Indirect Impacts of OHVs on Desert Tortoises and Habitat

Human Access: Berry (1996) indicated that human access results in increased damage to plants, animals, and soils. This access results in exploitation, removal, unintentional or intentional disturbance, and harassment of wildlife. She also reported adverse effects on other visitors and increased deposition of garbage and refuse. Fire regimes are altered as a result of human-induced fires and the proliferation of alien or non-indigenous plants.

USFWS (1994b) indicated that the presence of routes facilitates the removal of desert tortoises (predation for food, collecting for pets, and commercial trade), vandalism, and release of captive desert tortoises. Dumping, numbers and locations of wild fires, harvest and vandalism of vegetation, and predation by dogs and ravens may increase proportionate to available access. Routes have been implicated in the proliferation of weeds, resulting in more wildfire (USFWS 2002, USFWS 1994b). Berry (1996) found that tortoise populations decreased with increasing percentages of introduced annual plants.

Spread of Weeds: Lovich (1992) concluded that, among other things, tortoise habitats have been negatively affected by construction of roads and utility corridors. Brooks (1998) and Frenkel (1970) concluded that dominance of alien annual plants is the highest where road densities are high, and that minimizing the number of paved and dirt roads and maintaining non-roaded wilderness areas may reduce the dominance of aliens.

Trombulak and Frissell (2000) listed seven general effects of roads, including spread of exotic species, and indicated that roads are commonly identified as important correlates or indicators of loss of ecological health. They reported that roads provide dispersal of exotic species via three mechanisms: providing habitat by altering conditions, making invasion more likely by stressing or removing native species, and allowing easier movement by wild or human vectors. Hourdequin (2000) found that, whereas roads negatively affect some species, others may benefit; that many exotic plant species thrive along roadsides; that roads can act as corridors for the dispersal of plant seeds; and that roads may also provide habitat and movement corridors for opportunistic species such as weeds. Tracy (1995) showed that fires are mainly started along roads, and that a majority of those are along paved roads.

Route Proliferation: USFWS (1994b) identified route proliferation as a threat. LaRue (1997) reported that there had been a 27% increase in detectable routes between 1978 and 1989 in the Ord Mountain area. Much of it resulted from motorcycle use in the southern parts of the

proposed Ord-Rodman DWMA, west of and including the Cinnamon Hills. The USFWS (2002) reported that recreationists used legal routes to gain access to popular staging and camping sites, and that impacts emanated out from such areas, impacting less disturbed habitats. Stow (1988) reported that light OHV activity escalated into heavier use and more impacts. Vollmer *et al.* (1976) expressed concern that once an area was heavily used, recreationists would abandon the area in search of new and intact environments.

No OHV Impacts or Minimal Impacts Observed: Vollmer *et al.* (1976) found no indication that driving interfered with rodent reproduction, side-blotched lizard reproduction, or animal population trends. Few shrubs were outright killed, and plant density and diversity remained essentially unaltered. They found creosote bush recovered if root crowns were not destroyed; damaged plants were scarcely distinguishable after10 years. It was not clear that the density of annuals was reduced by vehicular traffic during their study.

OHV Impacts Uncertain: In 2002, the USFWS concluded that reductions in the amount of open routes are likely to provide some level of benefit to the desert tortoise. However, neither the BLM nor the USFWS had definitive information on how differing route networks may affect the desert tortoise; presumably, roadless areas would have the least adverse effect on desert tortoises and their habitat. Vollmer *et al.* (1976) found it difficult to gauge the impact of less intensive OHV-use areas. The extent that any changes in the access network affect the desert tortoise would be difficult to measure because of the slow reproductive rate of the species and other factors, such as disease, drought, and predation, that may be affecting the number of individuals in a region. No quantitative information was available concerning how frequently desert users leave routes of travel to camp, stop, and park outside of existing disturbed areas. In at least some areas that are occupied by the desert tortoise, the density of vegetation would likely prevent most desert users from leaving the routes of travel (USFWS 2002).

3.3.2.6.5 Off-Highway Vehicle Open Areas

Relative Tortoise Occurrence in Open Areas: Eight BLM open areas occur, including Johnson Valley, Stoddard Valley, El Mirage, Spangler Hills, Jawbone, Dove Springs, Rasor, and Olancha. Jawbone, Dove Springs, and Rasor are on the edge of the 2002 tortoise range, while Olancha is north of the known range. These areas were either not surveyed (Jawbone or Olancha) during sign count surveys, or no tortoise sign was observed during surveys at Rasor (i.e., 26 of 35 mi^2, 74%) and at Dove Springs (i.e., 3 of 6 mi^2, 50%). Survey coverage was relatively good at Johnson Valley (231 of 294 mi^2, 79%), Spangler Hills (i.e., 75 of 97 mi^2, 77%), and Stoddard Valley (i.e., 63 of 85 mi^2, 74%), and somewhat less representative of El Mirage (i.e., 16 of 40 mi^2, 40%). Most of the following discussion is relative to Johnson Valley, Stoddard Valley, El Mirage, and Spangler Hills open areas (see Appendix L for more information).

Higher Density Tortoise Areas: Higher density sign count regions within open areas are shown in Map 3-14. There were four higher density tortoise areas in the Johnson Valley Open Area, comprising 32 mi^2. Two of these (28 mi^2) were contiguous to the Ord-Rodman DWMA. Higher density areas were also found throughout much of the northern part of the Stoddard Valley Open Area, and were contiguous to higher density areas east of Highway 247, in the Ord-

Rodman DWMA. There were no higher density areas in El Mirage, although the survey effort was relatively light, and 5 mi^2 were found immediately northwest of Spangler Hills.

Relative Tortoise Occurrence in Open Areas[17]*:* Tortoise encounters were the highest in Stoddard Valley (i.e., 1 tortoise/10.5 linear miles of transects), intermediate in Johnson Valley (i.e., 1 tortoise/43.3 miles), and lowest in Spangler Hills (i.e., 1 tortoise/56.2 miles). El Mirage was relatively high (i.e., 1 tortoise/8.0 miles), but the sample size was sufficiently small that this was likely an artifact of the survey rather than a relative estimate of abundance.

The data suggest the following descending order of tortoise abundance in the four open areas: Stoddard Valley > Johnson Valley > (El Mirage, suspected) > Spangler Hills. Collectively, 22 live tortoises were observed over 520 linear miles of transects in these four open areas, for an encounter rate of 1 tortoise/23.6 miles of transects. For comparison, 154 live animals were observed on 2,293.5 miles of transects in three DWMAs (i.e., excluding Pinto Mountain), for an encounter rate of 1 tortoise/14.9 miles, or about 1.6 times higher than in open areas.

Relative Occurrence of Carcasses in Open Areas: Carcass encounters were the highest in Johnson Valley (i.e., 1 carcass/5.25 miles), intermediate at Stoddard Valley (i.e., 1 carcass/8.59 miles), and lowest in Spangler Hills (i.e., 1 carcass/12.5 miles). El Mirage was relatively high (i.e., 1 carcass/4.8 miles), but again, sample size was too small to be meaningful. The data suggest the following descending order of carcass abundance in the four open areas: Johnson Valley > Stoddard Valley > (El Mirage, suspected) > Spangler Hills.

Comparisons between Live Tortoises and Carcasses in Three Open Areas: The inverse relationship described previously for DWMAs was not observed in the three open areas. Table 3-25 shows the encounter rates for both tortoises and carcasses.

Table 3-25
Tortoise and Carcass Encounter Rates

AREA OF COMPARISON	ONE TORTOISE OBSERVED EVERY	ONE CARCASS OBSERVED EVERY
Stoddard Valley	10.5 mi	8.59 mi
Johnson Valley	43.3 mi	5.25 mi
Spangler Hills	56.2 mi	22.5 mi

Observations in three DWMAs (i.e., excluding Pinto Mountain) indicated an inverse linear relationship between live tortoises and carcasses; tortoises were more often encountered where fewer carcasses were found. Observations in the Stoddard Valley Open Area followed this pattern, but not for either Johnson Valley or Spangler Hills. Spangler Hills is relatively easily explained; very low encounter rates for both tortoises and carcasses suggests low densities of tortoises. Johnson Valley, however, appears to be an anomaly, as it was the only place where tortoises were difficult to find, but carcasses were relatively easy. Only 10 sign count tortoises

17 Appendix L shows encounter rates, carcass data and other calculations that were used in support of the above observations.

were observed in the 294 mi^2 Johnson Valley open area. Five were in higher sign count areas and five were outside. None was found in the 22 mi^2 higher density area southeast of the Ord-Rodman DWMA, where a recent die-off was detected. This may suggest that tortoises were once relatively more common than they are now (i.e., as evidenced by the prevalence of carcasses).

One measure is to divide the tortoise encounter rate by the carcass encounter rate. This ratio is 1.2 for Stoddard Valley, 2.5 for Spangler Hills, and 8.2 for Johnson Valley. The same ratio for the DWMAs is: 1.8 for Ord-Rodman, and 4.5 for Superior-Cronese and 7.0 for Fremont-Kramer. The lower ratios for Stoddard Valley, Ord-Rodman, and Spangler Hills (1.2, 1.8, and 2.5, respectively) coincide with regions of relatively more tortoise encounters compared to carcasses (excepting Spangler Hills, where both were less commonly found). This compares to the higher ratios for Superior-Cronese, Fremont-Kramer, and Johnson Valley (4.5, 7.0, and 8.2, respectively) where there were relatively fewer tortoise encounters compared to carcasses.

Dr. Berry documented a 77% decline between 1980 and 1994 on the Johnson Valley study plot, which is within the open area. All other such declines have occurred in the Fremont-Kramer and Superior-Cronese DWMAs. The two study plots showing the smallest declines were Lucerne Valley (i.e., 30% decreases between 1980 and 1994) and Stoddard Valley (5% between 1981 and 1991). These data suggest that there may be a differential die-off in Johnson Valley that is more similar to Fremont-Kramer and Superior-Cronese DWMAs than in Stoddard Valley and Ord-Mountain areas.

Relative Occurrence of Vehicle Impact Areas: Map 3-14 shows the spatial distribution of three types of vehicle impact areas that occur within the planning area: BLM open areas, heavy OHV use areas, and residential areas. Rules of polygon establishment described elsewhere were used to delineate these regions[18]. Importantly, only above-average vehicle impact data collected during sign count surveys (1998-2002) were used in polygon establishment. Although these types of impacts occur throughout many portions of the planning area not encompassed in the polygons, the identified regions (and data discussed herein) reflect the most severe and intense levels of vehicle impacts on lands where human uses are most concentrated (i.e., on at least four contiguous square miles where every square mile had above-average impacts).

Open areas are designated by the BLM for vehicle free play, and occur in seven specific areas. *Residential* impact areas occur in three general regions: west and northwest of the community of Silver Lakes, north of Hinkley, and in the "Coyote Corner," southwest of Fort Irwin. *Heavy OHV Use* areas are as disturbed as designated open areas, but are not officially designated for this form of vehicle use. The impact area between California City and the Rand Mountains is not a BLM open area, but it is very large and, in places, as impacted as open areas. Interestingly, there is also a 14 mi^2 area (i.e. East Sierra in Table 3-26) seven to eight miles north

[18] As in other similar calculations, although Map 3-14 shows the distributions of the larger polygons, only the square miles of data are included in the table and discussed in the text. Importantly, all data describe above-average vehicle impacts; there are individual square miles of similar disturbance and many other square miles affected by below-average impacts; these areas are significantly affected by vehicle impacts.

of Dove Springs that has experienced above-average vehicle impacts, but it is not clear if this is an extension of Spangler Hills impacts from the east or Dove Springs/Jawbone Canyon impacts extending north (likely the latter). These two, and the Edwards Bowl area south of Edwards AFB, are herein referred to as heavy OHV use areas.

Table 3-26
Relative Areas Affected by Recreational versus Residential Vehicle Impact Regions

TYPE OF IMPACT AREA	AFFECTED AREA		% TOTAL IMPACT AREA (TOTAL = 979 MI^2)
RECREATION			
Designated Open Areas	Inside	Outside	
Johnson Valley	205 mi^2	91 mi^2	296 mi^2 = 30%
Spangler Hills	71 mi^2	60 mi^2	131 mi^2 = 13%
Stoddard Valley	61 mi^2	58 mi^2	119 mi^2 = 12%
Dove Springs/Jawbone Canyon	2 mi^2	22 mi^2	24 mi^2 = 2%
El Mirage	14 mi^2	7 mi^2	21 mi^2 = 2%
Open Area Subtotals	353 mi^2	238 mi^2	
Open Area Total	591 mi^2		591 mi^2 = 60%
***Heavy OHV Use* Areas**			
California City/Rand Mountains	168 mi^2		= 17%
Edwards Bowl	31 mi^2		= 3%
East Sierra	14 mi^2		= 1%
Total	**213 mi^2**		**213 mi^2 = 21%**
Total Recreation	**(591 mi^2 + 213 mi^2) 804 mi^2**		**RECREATION 804 mi^2 = 81%**
RESIDENTIAL			
Coyote Corner	39 mi^2		= 4%
Silver Lakes	37 mi^2		= 4%
Hinkley	31 mi^2		= 3%
Total Residential	**107 mi^2**		**RESIDENTIAL 107 mi^2 = 11%**
Other	**77 MI^2**		**OTHER 77 MI^2 = 8%**
TOTAL ABOVE-AVERAGE VEHICLE IMPACT AREAS	**988 mi^2**		**ABOVE-AVERAGE VEHICLE IMPACT AREAS 988 mi^2**

Comparisons among these different regions are very important, as they differentiate *recreational* vehicle impacts from *residential* vehicle impacts. This is not to say that there is no overlap; there are likely both residential and recreational impacts in the northern Lucerne Valley and in the Rand Mountains, for example. However, in most cases, the impacts are clearly associated with either *recreational impact regions* (i.e., BLM open areas and heavy OHV use

areas) or *residential impact regions*. The relative sizes of these different regions and subregions are given in Table 3-27, and summarized as follows. The "% of Impact Area," given in the fourth column, lists the percentages of each subregional impact area relative to the total above-average vehicle impact area observed throughout the planning area, which was determined to be 988 mi^2.

Table 3-27
Cumulative Totals of Above-Average Vehicle-Based Impacts in Open Areas, Heavy OHV Use Areas and Residential Impact Regions

Area	Total mi^2	Mi^2 Obs	Sum	Ave	Range	Mi^2 Obs	Sum	Ave	Range
TRAILS						**TRACKS**			
Open Area	591	494	9417	19.1	1-250	548	78909	144.0	1-4000
Heavy Use	213	128	954	7.4	1-35	184	8903	48.3	1-585
Residential	107	49	191	3.9	1-22	94	2761	29.4	1-341
Total	**911**	**671**	**10562**	**15.7**	**1-250**	**826**	**90573**	**109.6**	**1-4000**
LITTER						**DUMPS**			
Open Area	591	549	20819	37.9	1-1080	0	0	0	0
Heavy Use	213	199	4940	24.8	1-305	0	0	0	0
Residential	107	49	191	3.9	1-22	6	7	1.2	0-2
Total	**911**	**797**	**25950**	**32.6**	**1-1080**	6	7	1.2	0-2
TARGET						**HUNTING**			
Open Area	591	213	3456	16.2	1-325	61	126	2.1	1-18
Heavy Use	213	98	653	6.7	1-53	25	39	1.6	1-4
Residential	107	48	874	18.2	1-525	23	55	2.4	1-8
Total	**911**	**359**	**4983**	**13.9**	**1-525**	**109**	**220**	**2.0**	**1-18**
CAMPING									
Open Area	591	66	161	2.4	1-25				
Heavy Use	213	15	22	1.5	0-3				
Residential	107	10	16	1.6	1-4				
Total	**911**	**91**	**199**	**2.2**	**1-25**				

Again, it is important to note that each square mile of impact was above-average for one or more of the eight vehicle-based disturbances: roads, trails, tracks, garbage/litter, hunting areas, target shooting areas, and camping. There were a total of 988 mi^2 of above-average vehicle impacts within the surveyed area. This comprises about a third (29%) of the 3,362 transects surveyed between 1998 and 2002.

Vehicle-based recreation (open areas and heavy OHV use areas) was responsible for a total of 804 mi^2 (81% of 988 mi^2) of above-average impacts. This was further segregated into 591 mi^2 associated with open areas. Of this, 353 mi^2 (60%) occurred within open areas, and 238 mi^2 (40%) occurred on lands adjacent to open areas (Map 3-14). This is a key finding, as it clearly shows that vehicle impacts are not restricted to designated open areas; 40% of observable above-average impacts are adjacent to open areas, including DWMAs. One should not forget that there were additional above-average square miles and below-average impact areas spread throughout the planning area. Only above-average impacts are discussed in this section.

Both inside and adjacent to open areas, Johnson Valley, Spangler Hills, and Stoddard Valley (given in descending order of the size of the affected area) cumulatively affected 546 mi^2, or about 92% of the 591 mi^2 impacted. Areas affected included Johnson Valley at 296 mi^2 (54% of 546 mi^2 attributed to all open areas), Spangler Hills (131 mi^2 or 24%), and Stoddard Valley (119 mi^2 or 22%) open areas.

The three heavy OHV use areas occupied 213 mi^2, most of this (168 of 213 mi^2, or 79%) was associated with the large area around California City, in the Rand Mountains, and adjacent areas. There were also 31 mi^2 of impacts in the Edwards Bowl area, and 14 mi^2 in the East Sierra, about seven miles north of the nearest open area. These are significant findings, indicating that in addition to the spill over effect of open areas given above, there are other areas that are being treated as if they were open areas. Cumulatively, the 213 mi^2 corresponds to about 21% of the total impact area (988 mi^2).

As described above, there were also three residential areas of above-average impacts affecting approximately 107 mi^2. These were about equal in size, including 39 mi^2 in the Coyote Corner area, 37 mi^2 in the Silver Lakes area, and 31 mi^2 north of Hinkley, including some overlap into higher concentration tortoise areas. Residential area impacts were responsible for about 11% (107 of 988 mi^2) of all above-average areas. There were also 13 smaller polygons of up to eight miles that, cumulatively, have impacted about 77 mi^2 in the surveyed area, or about 8%. These smaller impact areas are shown among the others on Map 3-14).

Characteristics of Vehicle Impact Areas: The types and intensity of impacts associated with each region are listed in Appendix L.

Table 3-27 reports the cumulative totals for trails, tracks, litter, dumps, target shooting, hunting, and camping among open areas, heavy OHV use areas, and residential areas.

Data were collected between 1998 and 2001, and those given in the above table include the 911 mi^2 of the 988 mi^2 (92%) impacted, excluding the 77 mi^2 encompassed in 13 smaller regions. Key findings and implications are bulleted below relative to the region of comparison:

Open Areas. Importantly, the data presented for open areas include those observed impacts that are inside (60% of 591 mi^2) and outside (40%) designated areas. Trails (19/mi^2), tracks (144/mi^2), litter (38/mi^2), and camping (2/mi^2) were more common in open areas than either heavy OHV use areas or residential areas. Tracks were about three time more prevalent than in heavy OHV use areas (144/mi^2 compared to 48.3 mi^2), and five time more prevalent than in residential areas (29.4/mi^2). Litter was similar in open areas (37.9/mi^2) and heavy OHV use areas (24.8 mi^2), but significantly lower in residential areas (3.9/mi^2, or 10 less common than in open areas). This is a key finding relative to raven management, suggesting that the BLM needs to implement a proactive education program in the open areas to minimize the amount of litter (and presumably attractiveness to ravens) available to ravens and other predators (including feral dogs) that threaten tortoises.

As shown in Appendix L, Johnson Valley exceeded the following average impacts given in parenthesis in the previous sentence: trails (22/mi^2), tracks (180/mi^2), litter (41/mi^2), target practice (17.4 compared to 16.2/mi^2), and camping (3.1 versus 2.4/mi^2). Johnson Valley was the only open area to exceed the average number of tracks among the five open areas.

Heavy OHV Use Areas: Impacts in these three regions were intermediate to open areas (where more impacts were observed) and residential areas (where there were relatively fewer impacts). Both target shooting (6.7/mi^2 compared to 13.9/mi^2 on average) and hunting (1.6/mi^2 compared to the average of 2.0) were relatively lower in heavy OHV use areas than in open areas (16.2/mi^2 shooting, 2.1/mi^2 for hunting) and residential areas (18.2/mi^2 shooting, 2.4/mi^2 hunting). Heavy OHV areas were also slightly lower in terms of camping (1.5/mi^2 compared to average ofg 2.2/mi^2) than in open areas (highest at 2.4/mi^2) and residential areas (1.6/mi^2).

Among the three heavy OHV use areas, California City into the Rand Mountains is the most impacted in terms of trails (8.0/mi2 compareed to Edwards Bowl, the next highest heavy OHV use area was highest in terms of litter (47.6/mi^2 compared to California City/Rand Mountains at 21.1/mi^2) and target practice (7.8/mi^2 compared to 6.5/mi^2 at California City).

Residential Areas. Importantly, all three residential vehicle impact areas are inside DWMAs, and cumulatively affect 107 mi^2. They are all about the same size (i.e., 35 mi^2). There is also a spatial importance among the three areas; impacts from Silver Lakes mostly affect the DWMA from the east, whereas Hinkley is partially within the DWMA, and Coyote Corner is fully within the DWMA.

Seven dumps were observed on 107 mi^2 surveyed, and were unique to this impact area, having not been recorded in either open areas or heavy OHV use areas. This is a significant finding relative to raven management, suggesting that dump clean up activities should be focused in these areas, all of which are within DWMAs.

Interestingly, both target shooting (18/mi^2 compared to 16/mi^2 in open areas) and hunting (2.4/mi^2 compared to 2.1/mi^2 in open areas) had the highest incidence of occurrence in residential areas. Again, on BLM-managed lands, this may help direct law enforcement to focal problem areas, which correspond to west of Silver Lakes in the Fremont-Kramer DWMA, north of Hinkley and in the Coyote Corner, both of which are within the Superior-Cronese DWMA.

Of the three residential areas, Hinkley was the highest for trails (5.1/m^2 compared to 3.6/mi^2 in Coyote Corner) and litter (104/mi^2 compared to 53/mi^2 in Coyote Corner). Coyote Corner was significantly higher in track counts (57/mi^2 compared to 15/mi^2 in Hinkley) and target shooting (37/mi^2 compared to 6/mi^2 west of Silver Lakes). Coyote Corner was also noteworthy for the amount of dumping, where 6 of 7 incidences (86%) were observed; the remaining dump was seen west of Silver Lakes, although dumping is far more common there, particularly just north of Shadow Mountain Road (LaRue, pers. obs.).

3.3.2.6.6 Organized Competitive OHV Events

OHV Speed Events: Unless otherwise noted, most of the following impact discussion for the Barstow-to-Vegas race was given in the Desert Tortoise (Mojave Population) Recovery Plan USFWS (1994b) and Burge's 1986 observations of the Frontier 500 Race. Burge (1986) found that the types of maneuvers that contributed to old and recent disturbances included circling in place, turning out, passing, backing up, parking, continuous paralleling of the road for a half mile or more, hill climbing, short coursing (short cutting), road widening, and leaving or joining the course from across open desert.

Competitive events have resulted in old routes being widened (1986, USFWS 1994b) and new routes being formed (Burge 1986, USFWS 1994b). Burge (1986) reported that the Frontier 500 Race resulted in stretches of existing roads that were widened 50 to 90 feet on each side. Burge (1986) and the USFWS (1994b) also identified straying from the designated course as a problem with both races. USFWS (1994b) reported that, during the Barstow-to-Vegas Race, motorcycles and other vehicles strayed beyond the designated course by an average of 30 feet, and caused damage or loss of hundreds of acres of desert tortoise habitat in the eastern Mojave Desert. Burge (1986) found that race-related tracks showed a 103% increase compared to pre-race track counts, and that 38% of discrete tracks, and hundreds of overlapping tracks, extended beyond the allowable course width of 100 feet.

Burge (1986) found that damaged shrubs were evident in every recent OHV track created by the Frontier 500 Race, and that 1,170 shrubs were crushed and uprooted along one transect surveyed after the event. Vollmer et al. (1976) reported that, in the course of one day, a motorcycle race in Kern County involving 700 motorcyclists, "devastated all vegetation in an area approximately 1-2 meters wide and 5 kilometers long." Prior to the Frontier 500 Race, Burge (1986) located and flagged 26 tortoise burrows, none of which was crushed, although she observed motorcycle tracks within one to two feet of several flagged burrows.

Impacts have also been associated with races that were not directly attributable to event participants. The USFWS (1994b) reported that non-event participants often camped in unauthorized areas, litter and garbage were often associated with such illegal campsites, and BLM and other monitors were unable to prevent or control these unauthorized activities.

Stoddard to Johnson Valley Competitive Event Corridor: BLM currently allows the use of the Stoddard-to-Johnson Valley Corridor, which runs through the southwestern portion of the proposed Ord-Rodman DWMA. Official use of this corridor for an organized event was last authorized by the BLM in 1994, when the "Stoddard Valley-to-Johnson Valley Point-to-Point Corridor Run" occurred.

The event, which occurred on 26 November 1994, was sponsored by the American Motorcyclist Association and monitored by the BLM and its appointees. Although the total racecourse was 173 miles long, all monitoring was restricted to the 21.25-mile Stoddard-to-Johnson Valley Corridor. Prior to the event, LaRue (1994) found a total of 24 tortoise burrows, including 17 burrows that were located between 6 inches and 40 feet from the designated route.

Although the event authorized participation of up to 500 motorcyclists, only 87 individuals actually participated (LaRue 1994). Racers were under "yellow flag conditions" that included (a) a well-marked route, (b) speed limits of 40 miles per hour for the eastern seven miles of the corridor and 30 miles per hour elsewhere, (c) pace motorcycles every 15 minutes that were not to be passed by event participates, (d) no passing of other racers while in the corridor, and (e) participants were timed and could not pass through the corridor in under 40 minutes. Additionally, there was light rain and snow immediately prior to and during the race, which likely reduced riders' tendencies to stray from the route to avoid dust created by the racer(s) that were immediately ahead of them (LaRue 1994).

LaRue (1994) found that 22 event-related tracks left the route for a total linear distance of 1,074 feet. The average track length was 48.8 linear feet and ranged from 10 to 300 feet in length. Perpendicular distances between the 22 tracks and the route averaged 3.95 feet and ranged from 0.5 to 20.0 feet. Most of the straying (i.e., 16 of 22 tracks, or 73%) occurred along Jensen Pass, which was the narrowest part of the corridor (i.e., 8.1 feet wide), and the remaining six tracks occurred along wider routes (i.e., widths ranged from 9.7 to 17.3 feet). Although the BLM employed 10 rangers, eight observers, and one helicopter between 24 and 26 November to enforce the closure of 119 square miles of desert that encompassed the corridor, LaRue (1994) still found 23 motorcycle tracks, 13 truck tracks, and 5 quad-runner tracks that were not caused by the racers. He concluded that the tracks were probably associated with monitors or unauthorized use by the general public.

Johnson Valley to Parker Competitive Event Corridor: The western portion of this corridor coincides with the northeastern boundary of the proposed Ord-Rodman DWMA. This is important because the USFWS (2002) reported that during events elsewhere along the route, riders were authorized to travel up to 100 feet from the centerline of the established road, along the southern side of the corridor to avoid impacts to the Chemehuevi DWMA in the East Mojave, which occurs north of the road. They (USFWS 2002) concluded that (a) this off-road travel was likely to kill or injure desert tortoises, disturb habitat, and could accelerate the spread of invasive species; (b) some potential existed for racers to cause degradation of habitat in the area surrounding the western end of the race (in the vicinity of the proposed Ord-Rodman DWMA); and (c) the proximity of the OHV event to the Chemehuevi DWMA posed, at a minimum, an indirect threat to the stability of the area, since tortoises travel beyond reserve area boundaries, and invasive plants may have more ready access to reserves if adjacent habitats are disturbed.

Dual Sport Events: The USFWS (2002) concluded that organized, non-speed events, such as dual sports rides in the western Mojave Desert, resulted in minimal habitat disturbance, if any, and that they were unaware of any injuries or mortalities of desert tortoises that have occurred during these events. They acknowledged that some level of mortality or injury may be undetected but impacts were anticipated to be minimal because dual sports occurred on existing roads and were usually conducted when most desert tortoises were inactive.

3.3.2.7 Current Effectiveness of Existing Protected Areas

Desert Tortoise Research Natural Area: Although there are several ACECs in tortoise habitat, only the DTNA was expressly established for conservation of the desert tortoise. The DTNA has been partially fenced since the late 1970's and completely fenced since the late 1990's. Even so, there are still threats to this most protected area. Each year a naturalist is employed by the Desert Tortoise Preserve Committee (DTPC) to educate the public about tortoise biology and protection. Several times each year, DTPC naturalists have encountered pet tortoise owners attempting to release their animals into the DTNA (Michael Connor, pers. comm., Nov. 2002). Some of these tortoises have been symptomatic for URTD or other diseases. The fence line has been cut from time to time and trespass motorcycle tracks have been seen bisecting the area within the fence (LaRue, 2001 pers. obs.). Feral dogs and ravens continue to be a problem.

Some have questioned the efficacy of fencing off large areas, such as the DTNA, when the data do not appear to show that tortoise populations are increasing inside the fence. Dr. Berry (pers. comm., Nov 2002) has shown that decreases have been similar on both sides of the fence, but that tortoise numbers within the fenced area remain somewhat higher than numbers outside the fence. Sign count and distance sampling data support Dr. Berry's findings that there have been significant declines in the DTNA and the surrounding region. Most importantly, they also show that there has been recent reproduction within the remnant population. Eight of 13 (61%) tortoises found inside the fenced area were subadult animals.

This may be a very significant finding, when one considers that the subadult cohort may only constitute 15 to 20% of the regional population. Within the 697 mi^2 area bounded by Garlock Road, Highway 14, Highway 58, and Highway 395, a total of 324 mi^2 (46%) were surveyed. All subadults observed within the 324 mi^2 surveyed area were located within, or immediately adjacent to, the DTNA (Map 3-9). The next nearest subadult was located 17 miles east of the DTNA, found in the spring during line distance sampling surveys. It is promising that there may be recruitment in an area that has experienced significant population declines, and noteworthy that no subadult animals were observed in any of the other older die-off regions. This may suggest that the perimeter fence is functioning in some manner to promote recruitment, and to minimize vehicle and sheep grazing impacts to reproducing females and new animals.

These recruits are exceedingly vulnerable to natural predators (especially coyotes and kit foxes), predators that have increased due to man (coyotes and ravens), vehicular cross-country travel, and trampling by sheep. Except for the predators, protective fencing has reduced or completely eliminated many of these impacts. And there is evidence that tortoise habitat is responding in a positive way. For example, during his studies at the DTNA, comparing various parameters inside and outside the fence, Dr. Matthew Brooks (1993) found (a) higher biomass of native annuals inside the fence; (b) higher biomass of non-native annuals outside the fence; (c) higher abundance of birds inside the fence; and (d) higher abundance of reptiles inside the fence. The increases, which likely show the results of habitat protection and rehabilitation, were attributed to less human use inside the fence.

Wilderness Areas: With the passage of the California Desert Protection Act, there are now a total of 684 mi^2 of wilderness within the planning area. This includes 17 wilderness areas, eight of which are completely or mostly outside the 2002 range of the tortoise[19]. Only the eastern 10 mi^2 of the 77 mi^2 Owens Peak Wilderness Area are within the range, where three transects were surveyed, and no tortoise sign found.

The remaining eight wilderness areas, encompassing 391 mi^2 (57% of all wilderness acreage), are fully within the tortoise range. As a general measure of tortoise conservation value, Table 3-28 lists the acreage of each area, acreage above and below 20% slope, and acreage above and below 4,000 feet elevation.

Table 3-28
Comparisons of Acreage, Percent Slope, and Elevation
Within Eight Wilderness Areas within the 2002 Tortoise Range

WILDERNESS AREA	TOTAL MI^2	MI^2 > 20% SLOPE	MI^2 < 20% SLOPE	MI^2 > 4,000 FT	MI^2 < 4,000 FT
Black Mountain	33 mi^2	7 mi^2 21%	26 mi^2 79%	0 mi^2 0%	33 mi^2 100%
Cleghorn Lakes	62	18 29%	44 71%	<1% 0%	62 100%
El Paso Mountains	38	12 32%	26 68%	7 19%	31 81%
Golden Valley	57	26 46%	31 54%	7 12%	50 88%
Grass Valley	51	3 6%	48 94%	1 2%	50 98%
Newberry Mountains	43	25 58%	18 42%	13 30%	30 70%
Rodman Mountains	54	20 37%	34 63%	17 32%	37 68%
Sheephole Valley	53	16 30%	37 70%	<1 0%	53 100%
Totals	391 mi^2 100%	127 mi^2 32%	264 mi^2 68%	45 mi^2 11%	346 mi^2 89%

Of the 261 tortoises observed during sign count surveys, 10 (3.8%) were found above 20% slope and 251 (96.2%) were observed below 20% slope. However, this is an artifact of survey effort, as only 214 of the 3,362 transects (6.3%) were surveyed above 20% slope. There were 10 tortoises found on the 214 transects surveyed above 20% slope, or 0.05 tortoises/transect (i.e., tortoises were observed on 5% of these transects). This compares to 251 tortoises observed on the remaining 3,158 transects surveyed below 20% slope, or 0.08 tortoises/transect (about 8% of the transects). Tortoises were encountered about 1.6 times more often below 20% slope than above that slope.

[19] The eight Wilderness Areas in the planning area that are outside or peripheral to the tortoise range include Argus Range, Bighorn Mountain, Bright Star, Coso Range, Darwin Falls, Kiavah, Sacatar Trail, and San Gorgonio.

Overall, one sees that 68% of the 391 mi^2 within these eight wilderness areas are below 20% slope, and therefore relatively more suitable tortoise habitat, in terms of this one factor. Grass Valley (94%), Black Mountain (79%), Cleghorn Lakes (71%), and Sheephole Valley (70%) are the wilderness areas that are predominantly below 20% slope. Newberry Mountain (58%), Golden Valley (46%), and Rodman Mountains (37%) rank as the three wilderness areas with relatively more area above 20% slope.

The 4,000-foot cut-off is another measure used in Table 3-28. The 3,362 transects were surveyed in an area[20] of 3,378 mi^2. There were 70 mi^2 surveyed above 4,000 feet and 3,308 mi^2 surveyed below 4,000 feet. Only one tortoise was observed above 4,000 feet, with the remaining 260 found below. When one factors in the area of survey, there were 0.014 tortoises/mi^2 (tortoises were observed in 1.4% of the survey area), compared to 0.078 tortoises/mi^2 (observed in 7.8% of the survey area). In general, then, tortoises were about 6 times more likely to be observed below 4,000 feet than above. As with 20% slope, most (89%) of wilderness areas occurs below 4,000 feet elevation, and are therefore relatively more suitable.

Given these observations, which suggest that wilderness areas are mostly below 20% slope (68%) and mostly below 4,000 feet elevation (89%), the next comparisons consider the data that were collected in these areas. The relative survey effort within each of the eight wilderness areas in the tortoise range where 141 sign count transects were surveyed between 1998 and 2002 are compared in the following table. Table 3-29 lists the number of transects surveyed, the area covered by the survey, and percent of the area surveyed within each of the eight wilderness areas.

Table 3-29
Sign Count Survey Effort within Each of the Eight Wilderness Areas in the Tortoise Range

WILDERNESS AREA	NO. TRANSECTS SURVEYED	NO. MI^2 SURVEYED	% OF AREA SURVEYED
Black Mountain	21 Transects	13 mi^2	39% of 33 mi^2
Cleghorn Lakes	12	12	19% of 62 mi^2
El Paso Mountains	10	4	10% of 38 mi^2
Golden Valley	14	6	10% of 57 mi^2
Grass Valley	35	30	59% of 51 mi^2
Newberry Mountains	15	10	23% of 43 mi^2
Rodman Mountains	29	24	44% of 54 mi^2
Sheephole Valley	5	2	4% of 53 mi^2
Totals	141 Transects	101 mi^2	26% of 391 mi^2

One can see that about 26% (i.e., 101 of 391 mi^2) of the eight wilderness areas was surveyed, ranging from a low of 4% in Sheephole Valley up to 59% in Grass Valley. Black Mountain (39%) and Rodman Mountains (44%) were also fairly well covered compared to many

[20] As in previous discussions, there is a slight discrepancy between the numbers of transects and the area surveyed. Both numbers are derived from GIS coverages, however the area surveyed is often smaller than the number of transects surveyed. Thus, in the table that follows, there were 141 transects covering only 101 mi^2, because only the area within a given square mile surveyed that occurs within wilderness is reported. These numbers should be considered as a rough index, and not necessarily characteristic of the entire area being described.

of the other wilderness areas. Although sample sizes were relatively small, data that were collected are given in Table 3-30, including the number of tortoises, number of higher density tortoise areas, tortoise sign (TCS), and carcasses observed. The area of survey is important relative to each of the observations, so the numbers of tortoises, carcasses, etc. are shown in parenthesis as the percent of transects surveyed within the area of comparison.

Table 3-30
Sign Count Tortoises, Carcasses, and Total Corrected Sign (TCS) Observed within Each of the Eight Wilderness Areas

	tortoise observations						
Wilderness Area (No. Transects)	No. Tortoises	No. of Carcasses	No./% w/out Sign	No./% w/ Sign	Range (Sum)	Average w/ Sign[21]	Mi^2 Above Average
Cleghorn Lakes (12)	3 (25%)	2 (17%)	4 (33%)	8/67%	0-20 (96)	12	8
Black Mountain (21)	1 (5%)	2 (9%)	3 (14%)	18/86%	0-34 (158)	9	6
Rodman Mountains (29)	4 (14%)	3 (10%)	8 (27%)	21/73%	0-14 (105)	5	5
Newberry Mountains (15)	2 (13%)	3 (20%)	3 (20%)	12/80%	0-4 (23)	2	0
Sheephole Valley (5)	0 (0%)	0 (0%)	2 (40%)	3/60%	0-14 (17)	6	0
Golden Valley (14)	0 (0%)	1 (7%)	9 (64%)	5/36%	0-1 (5)	1	0
Grass Valley (35)	0 (0%)	8 (23%)	23 (66%)	12/34%	0-3 (19)	2	0
El Paso Mountains (10)	0 (0%)	0 (0%)	7/70%	3/30%	0-3 (6)	2	0
Totals	**10**	**19**	**59**	**82**	**0-34 (53.6)**	**4.9**	**19**

The numbers would be interpreted using, for example, the Cleghorn Lakes Wilderness Area: 3 tortoises were found on the 12 transects (25%) surveyed; 2 carcasses (17%) were found; no sign was found on 4 (33%) transects; tortoise sign was found on 8 (67%) transects; a total of 96 pieces of sign were found, ranging from 0 to 20/transect; there was an average of 12 sign found on the 8 transects with sign; and there were 8 mi^2 of higher sign count areas.

These comparisons suggest that Cleghorn Lakes, Black Mountain, Rodman Mountains, and Newberry Mountains provide the most tortoise conservation value in terms of current tortoise occurrence. There were too few transects surveyed in the Sheephole Valley to determine where it would fit into this order. Golden Valley, Grass Valley, and El Paso may provide relatively less conservation value, although this may be more reflective of recent tortoise die-offs than lower conservation value. Note for example, that more carcasses were found in Grass Valley relative to the survey effort than any other area; so this area may have outstanding tortoise value, but older die-offs have affected the number of tortoises currently present.

The spatial distribution of the eight wilderness areas is an important factor regarding the relative value of these areas for tortoise conservation. Cleghorn Lakes and Black Mountain appear to be the two most valuable areas in terms of tortoise occurrence. The Cleghorn Lakes area is bisected by the 29 Palms Marine Corps Base, and the northern portions of this wilderness area on the base also support relatively higher tortoise concentrations (data were unavailable from 29 Palms for analysis, but show a concentration area immediately north of the one occurring on BLM-managed lands). It is very isolated from human uses, and not near any die-

[21] The "Average with Sign" column reports the average number of tortoise sign on transects where sign was found, so that transects with zero sign counts have been excluded.

off regions discussed herein. Black Mountain is a diverse area of lava flows, with the western portions above 20% slope, and no areas above 4,000 feet elevation. The southeastern corner coincides with higher density areas over 6 mi^2. Die-off regions immediately west and southeast of this area may threaten tortoises that remain.

Both the Newberry and Rodman mountains wilderness areas are comprised of steep slopes (58% and 37%, respectively, occur above 20% slope), much of which is above 4,000 feet (30% and 32%, respectively). The southeastern portion of the Rodman Mountains includes 5 mi^2 of higher density areas. These two areas appear to be intermediate in terms of tortoise occurrence and conservation. Neither appears to be affected by recent die-offs, although such an area occurs several miles west of the Newberry Mountains. There are too few data to see how the Sheephole Valley may fit into the order given in the table; additional surveys in this area would be needed to determine its relative value for tortoise conservation.

Although the El Paso Mountains and Golden Valley wilderness areas were relatively under-represented in the surveys, neither of them occurs in regions where any higher density tortoise areas were identified. The Grass Valley Wilderness Area received more survey effort than any other wilderness area, yet sign counts were sufficiently low throughout the area that no above-average tortoise areas were identified. The prevalence of carcasses at Grass Valley suggests that it was once more densely populated than at present, which does not diminish its value in terms of serving as a potential head starting area. In terms of current tortoise distribution, these three areas may provide relatively less value for tortoise conservation.

Relative Overall Conservation Value of Wilderness Areas: Are wilderness areas, alone, sufficient to conserve and recover tortoises? The answer is no, for the following reasons.

Wilderness areas encompass about 19 mi^2 of the 358 mi^2 (5.3%) area identified with higher sign counts. Three of the wilderness areas (El Paso, Cleghorn Lakes, and Sheephole Valley) encompass 153 mi^2 that are outside proposed DWMAs, and include 39% of all wilderness acreage in the planning area within the 2002 tortoise range. Cumulatively, wilderness areas within the range encompass 391 of 11,134 mi^2, or 3.5% of the potentially occupied tortoise habitat in the planning area. The 358-mi^2 area represents about 15% the size of the four proposed DWMAs, and as given above, only 205 mi^2 (61% of wilderness areas) occurs in DWMAs, which is about 8.8% of that entire area. It would appear that the Grass Valley area has already been affected by die-offs within and adjacent to that region, and Black Mountain is in imminent harm's way, assuming spread of disease from adjacent areas. Given the prevalence of carcasses, Grass Valley may serve as an excellent location to conduct head starting studies.

De facto tortoise protection in wilderness areas relies on the assumption that there are no roads and therefore no threats to tortoises. This is a false assumption for several reasons. First, not all tortoise mortality is caused by impacts associated with dirt roads. Tortoises in wilderness areas are still susceptible to raven and feral dog predation, various diseases, and catastrophic die-offs that cannot be readily explained, although disease, drought, and/or synergistic effects have been implicated. Second, there are still known adverse human uses, even without roads. Sheep graze the Golden Valley Wilderness Area, and vehicular trespass is considered to be a serious problem in places.

BLM Areas of Critical Environmental Concern: Thirty ACECs are found within the West Mojave planning area. Table 3-31 lists each ACEC, its size, focal protected resource, its location relative to the 2002 Tortoise Range Map, and the relative protection it provides [adopted from Current Management Situation (BLM 1999)].

Table 3-31
Tortoise Conservation Provided by ACECs

ACEC	SIZE ACRES	FOCUS OF COMMITMENT	SPATIAL LOCATION RELATIVE TO 2002 TORTOISE RANGE	RELATIVE PROTECTION AFFORDED BY EXISTING ACEC MANAGEMENT
Afton Canyon	8,160	Riparian habitat, raptors, bighorn, scenic values.	Fully within range, but focal area is canyon rather than surrounding bajadas	High. Routes are designated and mineral withdrawals are in place. Cattle grazing remains outside riparian zone.
Amboy Crater	679	Geologic landmark		Marginal tortoise habitat with little direct protection
Barstow Woolly Sunflower	314	Botanical resources, Barstow woolly sunflower in particular	Fully within range	Excellent protection from human impacts by perimeter fence
Bedrock Springs	785	Prehistoric values		Tortoises and habitat subject to OHV impacts from adjacent Spangler Hills Open Area
Big Morongo Canyon	28,274	Riparian habitat.	South of range	N/A, outside known range
Cronese Basin	10,226	Marsh, riparian, and lacustrine habitats.	Fully within range	High. Routes are designated
Desert Tortoise Research Natural Area	25,695	Desert animals and plants, Desert Tortoise in particular.	Fully within the 2002 Tortoise Range	Excellent protection from human impacts by perimeter fence
Fossil Falls	1,667	Prehistoric values		Within the northern portion of the range where tortoises are relatively less common
Great Falls Basin	9,726	Riparian habitat, Inyo California towhee	Eastern and southern portions of ACEC barely within range	Mostly north and west of the range.
Harper Dry Lake	475	Marsh habitat	Within range; 363 of 480 acres (76%) is non-habitat on the dry lake bed	Does not protect tortoise habitat.
Jawbone/ Butterbredt	187,486	Riparian and wildlife values.	At the western edge of range	Little protection, and 80% of the ACEC is outside the range
Juniper Flats	2,528	Cultural values	South of range	N/A, outside known range
Last Chance Canyon	5,913	Prehistoric and historic values		Not well protected from vehicle disturbance

ACEC	SIZE ACRES	FOCUS OF COMMITMENT	SPATIAL LOCATION RELATIVE TO 2002 TORTOISE RANGE	RELATIVE PROTECTION AFFORDED BY EXISTING ACEC MANAGEMENT
Manix	2,897	Paleontological and cultural values		Remote area with few tortoises
Mojave fishhook cactus	628	Botanical		Unfenced ACEC is subject to heavy impacts from sheep grazing and motorcycle use in the Brisbane Valley
Rainbow Basin	19,480	Geologic features, wildlife species (desert tortoise)	Fully within range, very near Mud Hills/ Water Valley concentration area	Moderate. Routes are designated, but off-road travel still occurs
Red Mountain Spring	717	Prehistoric values		Unknown
Rodman Mountains Cultural Area	6,204	Cultural Resources		Mostly within wilderness
Rose Spring	859	Prehistoric values	At northern edge of range	Unknown
Sand Canyon	2,338	Riparian habitat and wildlife	West of range	N/A, outside known range
Short Canyon	1,100	Riparian habitat, Plants in particular	West of range	N/A, outside known range
Soggy Dry Lake Creosote Rings	186	Ancient vegetation		Within the known range, but inside open area, which degrades habitat and results in tortoise crushing
Steam Well	41	Historic and prehistoric values		Little protection in this area where die-offs may have eliminated many tortoises
Trona Pinnacles	4,055	Scenery and geological features		Very marginal habitat; tortoise present subject to impacts from adjacent Spangler Hills Open Area
Upper Johnson Valley Yucca Rings	353	Ancient vegetation		Tortoises and occupied habitats threatened by use in Johnson Valley Open Area, which surrounds this ACEC
West Rand Mountains*	29,440	Species specific, desert tortoise	Fully within range	Major problems with compliance on OHV travel have been identified.
Whitewater Canyon	16,381	Wildlife		N/A, West Mojave portion of ACEC is at upper elevations, out of range

* Signed by CDFG under Federal Authority of the Sikes Act.

Existing ACEC protection ranges from very high protection at fenced sites (i.e., DTNA and Barstow Woolly Sunflower ACECs), to very little or no protection (i.e., Harper Lake and West Rand Mountains ACEC), to being inapplicable because the ACEC is outside the range. Only the DTNA is expressly managed for tortoise conservation; there are few formal ACEC management prescriptions that provide for more protection than other regulations (habitat management in BLM habitat categories, USFWS critical habitat, under FLMPA).

3.3.3 Mohave Ground Squirrel

3.3.3.1 Mohave Ground Squirrel Range

Distribution: The entire known range of the Mohave ground squirrel (MGS) is within the planning area (Map 3-15) except for a very small area northeast of Searles Valley, in the NEMO planning area. The known range (Gustafson 1993) is bounded to the south by the San Gabriel and San Bernardino mountains, to the east and southeast by the Mojave River, to the west by Palmdale and Lancaster[22], to the west and northwest by the Sierra Nevada, to the north by the Coso Range and Olancha, and to the northeast by the Avawatz and Granite mountains on the Fort Irwin National Training Center.

The MGS has apparently been eliminated from Lucerne Valley (Wessman 1977), where it was first trapped (at Rabbit Springs) in 1886. The most recent (1993) range map no longer includes the western portion of the Antelope Valley east to Highway 14 between Palmdale and Mojave, an area previously considered within the MGS's range (CDFG 1980). No new data collected since 1993 support either extensions or reductions of the known range.

The known range of the MGS is probably associated with elevation, rainfall patterns, temperature, suitable plant communities and substrates, topographical barriers, and other factors. In reviewing available records, Gustafson (1993) found that the highest known elevation was at 5,600 (1,728 meters) feet on China Lake NAWS (Michael Brandman Associates 1988). Laabs (1998) reported the highest known elevation at about 5,000 feet (1,524 meters), which occurred along the eastern slope of the Sierra (Freeman Canyon, Bird Spring Canyon, and Jawbone Canyon). The California Natural Diversity Data Base (CNDDB) has reported them from an elevation range of 1,800 to 5,000 feet (548-1524 meters).

Rainfall patterns, temperature, and plant communities are interrelated and influenced by elevation gradients. Gustafson noted that the northwestern portion of the ranges of both the MGS and Joshua trees are coincident near Olancha. Most of the 30 plant communities where the MGS has not been observed are associated with relatively higher elevations or are outside the range (LaRue, 1998 unpublished data). The northeastern part of the range, on Fort Irwin, may be limited due to rainfall and/or topographical barriers such as mountains, major washes, dunes, and dry lakes (Gustafson 1993). Gustafson suggested that lakes of the Pleistocene era might have restricted the current range from extending east of the Mojave River and north of the Owens Valley.

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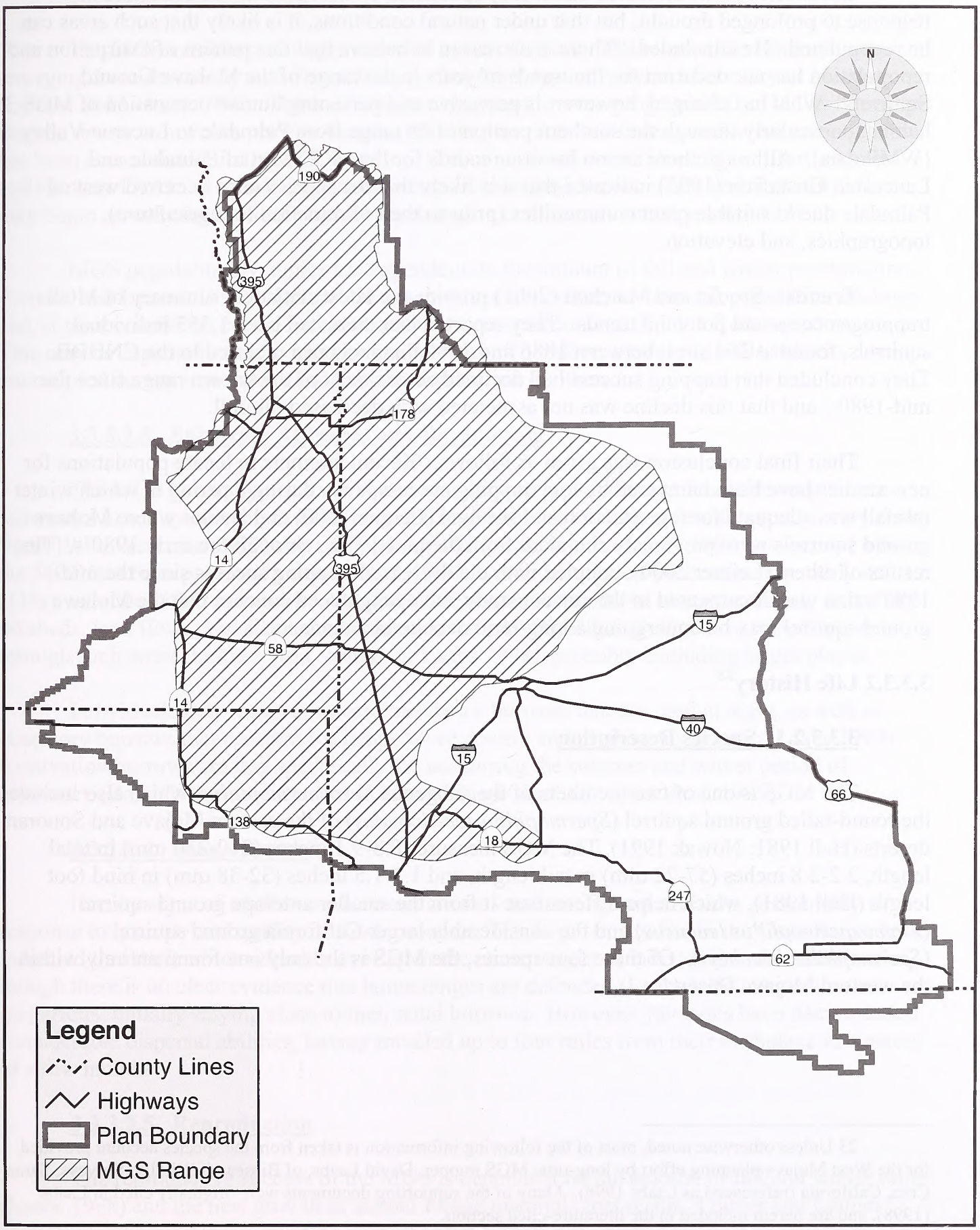
22 Laabs (1998) found no records for the Antelope Valley west of Palmdale and Mojave.

Range of Mohave Ground Squirrel



West Mojave Plan FEIR/S
Map 3-15

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Gustafson (1993) indicated that local populations of the MGS might disappear in response to prolonged drought, but that under natural conditions, it is likely that such areas can be repopulated. He concluded, "There is no reason to believe that this pattern of extirpation and repopulation has not occurred for thousands of years in the range of the Mohave Ground Squirrel." What has changed, however, is pervasive and persisting human occupation of MGS habitat, particularly through the southern portion of its range from Palmdale to Lucerne Valley (WMP data). Although there are no historic records for the MGS west of Palmdale and Lancaster, Gustafson (1993) indicated that it is likely that the species once occurred west of Palmdale due to suitable plant communities (prior to their elimination for agriculture), topographies, and elevation.

Trends: Brooks and Matchett (2001) provide the latest statistical summary of MGS trapping success and potential trends. They reported that there had been 1,353 individual squirrels, found at 264 sites, between 1886 and 2000 that had been reported to the CNDDB. They concluded that trapping success had declined across most of the known range since the mid-1980s, and that this decline was not associated with decreased rainfall.

Their final conclusion was given as follows, "Recent attempts to locate populations for new studies have been hampered by low trapping success, even during a period in which winter rainfall was adequate for reproduction and survival (Leitner 2000) and at sites where Mohave ground squirrels were previously abundant from the mid-1970's through the early 1980's. The results of others (Leitner 2000), coupled with the decreased trapping success since the mid-1980's that was documented in the current study, have heightened concern that the Mohave ground squirrel may be undergoing a long-term decline in abundance."

3.3.3.2 Life History[23]

3.3.3.2.1 Species Description

The MGS is one of two members of the subgenus *Xerospermophilus*, which also includes the round-tailed ground squirrel (*Spermophilus tereticaudus*) of the eastern Mojave and Sonoran deserts (Hall 1981; Nowak 1991). The MGS measures 8.3-9.1 inches (210-230 mm) in total length, 2.2-2.8 inches (57-72 mm) in tail length, and 1.3-1.5 inches (32-38 mm) in hind foot length (Hall 1981), which helps differentiate it from the smaller antelope ground squirrel (*Ammospermophilus leucurus*) and the considerably larger California ground squirrel (*Spermophilus beecheyi*). Of these four species, the MGS is the only one found entirely within the western Mojave Desert.

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23 Unless otherwise noted, most of the following information is taken from the species account provided for the West Mojave planning effort by long-time MGS trapper, David Laabs, of Biosearch Wildlife Surveys, Santa Cruz, California (referenced as Laabs 1998). Many of the supporting documents were originally cited in Laabs (1998), and are herein included in the literature-cited section.

3.3.3.2.2 Seasonal Activity

The MGS exhibits a strongly seasonal cycle of activity and torpor (like hibernation), emerging from dormancy as early as January, but more typically in mid-February or March (Leitner and Leitner 1996). Dates of emergence appear to vary geographically. Males typically emerge one or two weeks prior to females (Recht, pers. comm.). Once a sufficient amount of fat has been accumulated, individuals enter a period of aestivation and hibernation (Bartholomew and Hudson 1961). Aestivation generally begins sometime between July and September, but may begin as early as April or May during drought conditions (Leitner, *et al.*, 1995).

MGS population dynamics are dependent on the amount of fall and winter precipitation (Leitner and Leitner 1996). The failure to reproduce may result in dramatic population declines and, if poor conditions persist for several seasons, may become extirpated from a given area. This may be especially true in less optimal habitats. Therefore, entirely suitable habitats can be unoccupied during some years and become reoccupied in others.

3.3.3.2.3 Substrate Affinities and Burrow Use

The MGS generally occurs in flat to moderate terrain and is not found in steep terrain. Substrates in occupied habitats have ranged from being very sandy to, less frequently, very rocky (Best 1995, Wessman 1977). For example, of 102 transects surveyed in 1998 (see below) where the MGS had been previously detected, 91 (89%) were identified as predominantly sandy and 11 (11%) were identified as being rocky. The MGS is considered to be absent, or nearly so, on dry lakebeds, lava flows, and steep, rocky slopes (Clark 1993), although juveniles may disperse through such areas (Leitner, pers. comm. in Laabs 1998), probably excluding larger playas.

Individuals may maintain several residence burrows that are used at night, as well as accessory burrows that are used for temperature control and predator avoidance (Laabs 1998). Aestivation burrows are dug specifically for use during the summer and winter period of dormancy (Best 1995), and often occur beneath large shrubs (Leitner *et al.* 1995).

3.3.3.2.4 Home Ranges

Home ranges of adults vary between seasons and throughout a season, presumably in response to quantity and quality of food resources. The Leitners' studies in the Coso Range have indicated that there is considerable overlap in the home ranges of individual males and females, though there is no clear evidence that home ranges are defended (Laabs 1998). Juveniles are gregarious, initially staying close to their natal burrows. However, juveniles have demonstrated considerable dispersal abilities, having traveled up to four miles from their birthplace in a matter of a few months.

3.3.3.2.5 Reproduction

The reproductive success of the MGS is dependent on the amount of fall and winter rains (Laabs 1998) and the new growth of annual forage materials that result. Leitner and Leitner (1992) hypothesized that a standing crop of about 1 gram per square foot may be necessary for

MGS reproduction to occur. Leitner and Leitner (1996) found a clear correlation between fall and winter precipitation and the number of juveniles appearing on the same plots in subsequent years. Following low rainfall, annual herbaceous plants are not readily available, the MGS is unable to attain a minimum amount of body fat (identified by the Leitners as 180 g total body weight), and in such years the species forgoes breeding (Recht, pers. comm. in Laabs 1998; Leitner *et al.* 1995).

The Leitners have consistently observed that in years of poor rainfall (i.e., less than 75 mm since the MGS entered hibernation), the MGS foregoes reproduction in favor of attaining sufficient body fat to make it through the winter. This is likely a physiological adaptation to ensure adult survival, and to avoid birthing young when resources are not sufficient for juveniles to acquire necessary body fat to hibernate. Gustafson (1993) indicated that the "evolutionary strategy of suspending reproductive activity and concentrating on gaining weight ensures the survival of the species (Leitner and Leitner 1990), as long as droughts are of short duration and sufficiently large areas of habitat exist."

MGS adults are solitary except during breeding, which occurs soon after emergence from hibernation. Gestation lasts 28-30 days, at which time between 4 and 10 young are born per litter. Juveniles emerge from natal burrows within four to six weeks, and begin to establish their own home ranges by about mid-May. Mortality is high during the first year (Leitner and Leitner 1996). Females breed in the spring if environmental conditions are appropriate, while males do not normally mate until two years of age (Leitner and Leitner 1996). Laabs (1998) indicated that sex ratio is consistently female biased, with ratios as high as seven females for each male.

3.3.3.2.6 Dispersal

Juveniles begin making exploratory movements away from the natal burrow by about mid-May to early June, and some individuals eventually make long-distance movements (Leitner et al. 1997). Recent radio-telemetry data suggest that females are more likely than males to remain near their natal burrows (Leitner *et al.* 1997). In 1997, the majority of radio-collared juvenile males moved greater than 0.6 miles (1 km.), up to a maximum of 3.9 miles (6.2 km.). Juveniles can apparently traverse steep terrain during dispersal (Leitner, pers. comm. in Laabs 1998), and some are known to disperse 3-4 miles from their birthplace (Leitner 1998).

The current, 2002 status of the MGS, in terms of numbers of individuals and amount of occupied habitat, is difficult to assess due to the limitations of available data. The data that are available, the potential associations between MGS historic occurrences and existing habitat characteristics, results of recent trapping studies, etc. are compared and discussed in the following sections.

3.3.3.3 Winterfat, Spiny Hopsage, and MGS Occurrence

In the northern portion of its range, the MGS feeds on the leaves (in particular), seeds, and fruits of perennial plants (mostly shrubs) when annual plants are not available. Shrub species that were consumed most often at the Leitner's Coso study sites were spiny hopsage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*) and saltbush (*Atriplex* sp.) (Leitner and Leitner

1996). As herbaceous annuals appear in the spring, the MGS shifts to leaves, flowers, seeds and/or pollen of forbs (annual plants). Once the ephemeral forage disappears in a normal rainfall year, the MGS resumes feeding on shrub parts until entering hibernation. If no ephemeral forage is available in a given season, the MGS subsists entirely on perennials.

The Leitners have shown, through repeated observations employing consistent live-trapping methodologies and fecal analyses, that winterfat, hopsage, and various saltbush species (genus *Atriplex*) are common components of the MGS diet in the northern part of its range, at Coso Hot Springs. They have demonstrated that winterfat and hopsage, in particular, comprise a large part of the MGS' diet during years when rainfall was below about 75 mm at their study plots. They have hypothesized that these two plants may be critically important in allowing the MGS to attain 180 g body weight during dry years when preferentially selected annual plants are unavailable.

It remains unknown, but is plausible, that these plants are equally important to the south. Dr. Anthony Recht (1977) found that MGS at Saddleback Butte in Los Angeles County consumed substantial amounts of Russian thistle (*Salsola tragus*), which he found to have a very high water content, and others have documented MGS feeding heavily on the seeds of Joshua trees (*Yucca brevifolia*) (Laabs 1998). The Leitners have been very cautious to apply their Coso results to MGS foraging preferences elsewhere in the planning area, because their study sites are located within about 15 to 20 miles of the northern range boundary line. The comparisons given below, however, suggest that there may be a relationship between the prevalence of these two plants and the relative occurrence of (trappable) MGS elsewhere in the western Mojave Desert.

Recent evidence suggests that winterfat and spiny hopsage may be important forage species well to the south of the Coso study sites. In 1998, 344 perennial vegetation transects were surveyed both within the range to the south and in the Ord-Rodman DWMA, east of the range[24] (Map 3-16). Each transect surveyed during this "1998 survey" consisted of a ¾-mile, equilateral triangle. All perennial plant species within one meter of each transect were counted. Transect locations included:

- 102 places where the MGS was previously observed (i.e., CNDDB, Debi Clark records, and 19 of 22 sites surveyed by Aardahl and Roush (1985) (the "Aardahl-Roush sites");
- 208 additional locations in "High" and "Medium" quality habitats[25] within the known range; and,
- 34 sites in the Ord-Rodman area, located east, south, and northeast of the known range.

24 Surveyors (transects given in parenthesis) included LaRue (237 transects), botanists Dave Fleitner (87), Dave Silverman (7), and R.T. Hawke (3), and by biologist Dave Roddy (10). Transects were surveyed in the spring and summer of 1998. As indicated in the text, 34 transects were in the proposed Ord-Rodman DWMA).

25 The 208 transects were systematically (rather then randomly) located at about two-mile intervals within the 1993 polygons that CDFG and others identified as "High" and "Medium" quality habitats (although those designations have since been dismissed; see U.S. Bureau of Land Management 2000).

Table 3-32 shows the relative abundance of perennial and annual plants, winterfat, hopsage, and saltbush observed during the 1998 Survey on the 102 sites with historic MGS records and the 208 additional sites within the known range. Numbers represent the number of plants observed on a given (or average) transect.

Table 3-32
Comparisons Among Habitat Variables Observed Along 1998 Survey Transects

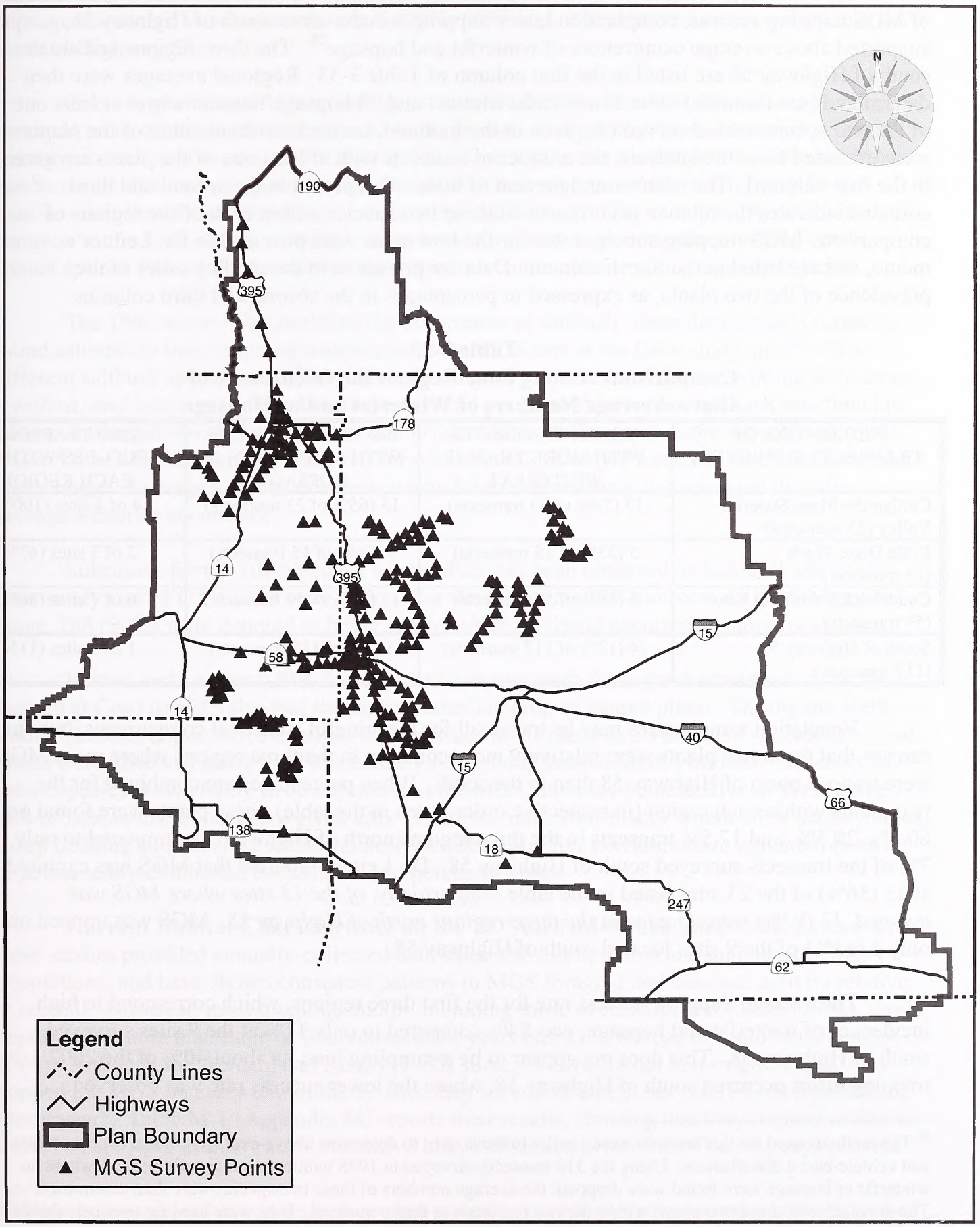
NUMBER OF PLANTS						
Transect Type	Perennial Plants	Annual Plants	Winterfat	Hopsage	Saltbush	Hopsage & Winterfat
102 With MGS Records	Range: 3 to 21 Mean: 9.8	3 to 38 19.5	0 to 458 15.1	0 to 164 14.6	0 to 463 89.2	1 to 164 / 1 to 458 28.0 32.0
208 Without MGS Records	Range: 2 to 19 Mean: 10.6	7 to 47 21.2	0 to 423 23.3	0 to 242 21.0	0 to 646 82.2	1 to 242 / 1 to 423 36.0 40.0
NUMBER (%) OF TRANSECTS WITH NO OCCURRENCES OF SPECIFIED PLANT						
102 With MGS Records	N/A	N/A	45 (44%)	38 (37%)	51 (50%)	24 (23%)
208 Without MGS Records	N/A	N/A	73 (35%)	60 (29%)	86 (41%)	39 (19%)

These data suggest that the average numbers of winterfat and hopsage observed were about the same within each of the two transect categories (15.1 versus 14.6 and 23.3 versus 21.0). The largest numbers of winterfat exceeded those of hopsage two times on 102 transects (211 and 458 for winterfat versus 164 for hopsage) and two times on 208 transects (367 and 423 versus 242). This indicates, on average, that winterfat and hopsage may occur in similar numbers on a regional scale, but that winterfat occasionally occurs in denser aggregations than observed for hopsage.

In comparing the two data sets, relatively more winterfat and hopsage occurred on the 208 transects than on the 102 surveyed at historic MGS locations. This is also reflected in the relatively lower percentages of the 208 transects where one or the other (or both) plants were absent. This is not clear evidence against the current hypothesis that these two plants (and probably others) may be critically important to MGS survival. Far too many factors govern MGS densities and distribution to fully understand the relationship between MGS and plant occurrence. For example, there is no evidence that MGS was absent from the 208 transects, which were all within the range. With the exception of transects surveyed between Lancaster and Lucerne Valley, most transects occurred in suitable, potentially occupied habitats, where there have been recent and historic observations.

In a memo dated 6 August 2002, Dr. Leitner indicated that 48 of these 310 transects included occurrences of: (1) 100 or more winterfat, hopsage, or the two combined or (2) between 50 and 99 of either hopsage or winterfat. He found that 33 of these 48 occurrences (69%) were concentrated in three specific areas: 12 (25%) in the Little Dixie Wash area, between the Sierra Nevada and Ridgecrest/Inyokern; 11 (23%) in the Cuddeback Dry Lake/Pilot Knob area; and 10 (21%) in the Coolgardie Mesa/Superior Valley area). The remaining 15 transects with the concentrations of these plants were generally scattered, with only five occurrences south of Highway 58.

1998 Mohave Ground Squirrel Transects



West Mojave Plan FEIR/S
Map 3-16

Scale: 1 : 1,750,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

The 1998 vegetation data were independently assessed to determine if these three regions of MGS trapping success, compared to lower trapping success areas south of Highway 58, supported above-average occurrences of winterfat and hopsage[26]. The three regions and areas south of Highway 58 are listed in the first column of Table 3-33. Regional averages were then determined (see footnote) to be 33 winterfat/transect and 28 hopsage/transect where at least one of the two species was observed (as given in the footnote, transects without either of the plants were excluded from the analysis; the number of transects with at least one of the plants are given in the first column). The number and percent of transects reported in the second and third columns indicates the relative occurrences of these two species within each of the regions of comparison. MGS trapping success rates for the four areas were provided in Dr. Leitner's memo, and are listed in the fourth column. Data are presented in descending order of the prevalence of the two plants, as expressed in percentages in the second and third columns.

Table 3-33
Comparisons Among Four Regions for Occurrence of Above-Average Numbers of Winterfat and/or Hopsage

REGION (NO. OF TRANSECTS SURVEYED)	NO. (%) TRANSECTS WITH MORE THAN 33 WINTERFAT	NO. (%) TRANSECTS WITH MORE THAN 28 HOPSAGE	2002 TRAPPING SUCCESS WITHIN EACH REGION
Coolgardie Mesa/Superior Valley (23 transects)	13 (56% of 23 transects)	15 (65% of 23 transects)	4 of 4 sites (100%)
Little Dixie Wash (15 transects)	5 (33% of 15 transects)	4 (26% of 15 transects)	2 of 3 sites (67%)
Cuddeback Lake/Pilot Knob (59 transects)	6 (10% of 59 transects)	15 (25% of 59 transects)	6 of 7 sites (86%)
South of Highway 58 (117 transects)	14 (12% of 117 transects)	3 (2% of 117 transects)	1 of 9 sites (11%)

Vegetation sample sizes may be too small for meaningful statistical comparisons, but one can see that these two plants were relatively more common in the three regions where more MGS were trapped north of Highway 58 than to the south. When percentages are combined for the two plants within each region (in respective order given in the table), these plants were found on 60.5%, 29.5%, and 17.5% transects in the three regions north of Highway 58, compared to only 7% of the transects surveyed south of Highway 58. Dr. Leitner reported that MGS was captured at 13 (56%) of the 23 sites listed in the table. *Importantly, of the 13 sites where MGS was trapped, 12 (92%) were located in the three regions north of Highway 58.* MGS was trapped on only 1 (11%) of the 9 sites located south of Highway 58.

The average trapping success rate for the first three regions, which correspond to high incidences of winterfat and hopsage, was 84% compared to only 11% at the 9 sites surveyed south of Highway 58. This does not appear to be a sampling bias, as about 40% of the 2002 trapping effort occurred south of Highway 58, where the lower success rate was observed.

[26] The methods used for this analysis were similar to those used to determine above-average tortoise concentrations and vehicle-based disturbances. Using the 310 transects surveyed in 1998 within the range, all transects where no winterfat or hopsage were found were dropped; the average numbers of these two species were then determined. The prevalence of these two plants within the two regions was then compared. Data were used for transects shown on Map 3-18, and included the three regions of higher trapping success and all transects south of Highway 58.

Finally, the 84% success rate was associated with areas where 87% of the high winterfat and hopsage abundance was observed; only 5 (13%) of 38 high abundance transects were found south of Highway 58.

One interpretation of these findings is that the MGS is somewhat more common in surveyed areas of abundant winterfat and hopsage north of Highway 58, and somewhat less common in survey areas south of Highway 58. More studies are needed before firm conclusions can be made. It is entirely possible that the MGS is less common south of Highway 58 for reasons other than lower abundances of winterfat and hopsage. For example, MGS may be less common to the south due to relatively more human impacts, higher incidence of non-native annual species (which Dr. Leitner has suggested), or some unknown environmental factor.

The 1998 survey also recorded the occurrence of saltbush, since the Leitner's research found saltbush to be a recurring component in the MGS diet at the Coso study sites[27]. Five different saltbush species were observed, including *Atriplex canescens, confertifolia, polycarpa, spinifera, and lentiformis*. Based on these data and personal observation, saltbush was found to have a similar pattern of occurrence as winterfat. Although the upper range for saltbush (646) was 1.5 times higher than that observed for winterfat (423), only 4 transects exceeded winterfat's upper range. Average saltbush occurrence was 3.5 to 6 times more concentrated than the average winterfat occurrence.

Substrates for the 102 transects where MGS has been observed included 91 (89%) that were sandy and 11 (11%) that were rocky. For the remaining 208 transects within the known range, 188 (90%) were denoted as being sandy, while 20 (10%) occurred in more rocky areas.

Leitner and Leitner (1989, 1990) found that sites with the highest incidence of the MGS trapped at Coso in 1988 also had the highest standing crop of annual plants. During the 1998 studies (LaRue, unpublished data), as few as three and as many as 38 different species of annual plants were observed along the 102 transects surveyed at known MGS locations. Diversity of native species is also likely to be important to the MGS, and may be indicative of the relative lack of human disturbance in a given area. There are numerous places where OHV staging areas, sheep bedding and watering sites, and newly brushed pipeline corridors have either temporarily or permanently eliminated both annual and perennial plants.

Current Habitat Characteristics on the 19 "Aardahl-Roush Sites:" The Leitner's Coso studies provided annually-collected data since 1989 in both low and high density MGS populations, and have shown consistent patterns in MGS foraging and seasonal activity relative to rainfall. However, most trapping studies, including those of Aardahl and Roush (1985), rarely persisted for more than three or four consecutive years (see U.S. Bureau of Land Management 2000). Although the Aardahl and Roush (1985) survey was restricted to a single season, they trapped the MGS on *every one* of the 22 sites they surveyed, which has rarely been repeated in recent years. Table M-1 (Appendix M) reports their results, showing that they trapped as few as 1 (DTNA site) and as many as 68 (Golden Valley) MGS at a given site. Their surveys provide

27 Winterfat, hopsage, and saltbush are each members of the Chenopod family (often referred to as the "Goosefoot" family).

an excellent opportunity to compare current vegetation data with sites where multiple MGS have been observed.

The 1998 vegetation data relative to 19 of the 22 Aardahl-Roush sites are given in Table M-1 (Appendix M). Surveys were conducted prior to the current widespread use of GPS units, which is true for most of the non-military surveys up until a few years ago. However, transects locations were relatively more accurate because their 19 sites were delineated on 7.5' USGS quad maps, as opposed to CNDDB records, for example, which specify that a given MGS record occurred somewhere within a 160-acre, quarter section.

Aardahl and Roush (1985) trapped a total of 350 MGS on the 19 sites reported in Table M-1. Like many other studies, they did not differentiate between adults and juvenile MGS, so captured animals may have either been resident or dispersing through the trap area. That they trapped the MGS at every site is significant, when one considers recent trapping efforts on regional scales where no MGS have been trapped (see Brooks and Matchett 2001).

The 1998 surveys found that creosote bush scrub was found at 12 (63%) of their sites, saltbush scrub at 5 (26%) sites, and blackbush scrub at 2 (11%) sites. Of the 350 MGS trapped in 1985, 235 (67%) were in creosote, 107 (31%) were in saltbush, and the remaining 8 MGS (2%) were found in blackbush scrub. These data reflect what was also found on a regional scale when the prevalence of plant communities was compared to historic reports of the MGS: the prevalence of MGS is proportionate to the prevalence of a given plant community (Table 3-34, below), both at a regional level and among the 19 sites trapped by Aardahl and Roush[28].

Winterfat and/or hopsage were observed on 14 (74%) of the 19 sites. On one of the five transects where winterfat and hopsage were not observed (Aqueduct South), 16 winterfat plants were observed in adjacent areas, although none was observed along the transect. On two other sites (Bowman Road South and Kramer Hills), although there were no winterfat or hopsage, chenopods were well represented, with 294 and 141 saltbush found, respectively. Given these and other observations, it is important to exercise caution in reviewing results, such as the ones presented herein, and applying them to management practices. For example, it would be premature to identify "source areas" (i.e., areas where MGS persist during prolonged drought) based solely on the presence or prevalence of winterfat and hopsage. However, these results do support the hypothesis that chenopods (particularly winterfat and hopsage) may be important to MGS foraging ecology.

[28]One must exercise caution when accepting plant community designations, for example, like "creosote bush scrub" and "saltbush scrub," because of the variability of shrubs comprising such communities. Creosote bush (*Larrea tridentata*), from which the community derives its name, is necessarily a part of the so-named plant community, but is often not the most abundant plant. For example, on the 12 Aardahl-Roush sites that LaRue identified as creosote bush scrub, creosote bush was the most abundant plant only on 1 (8%) of the 12 sites. The dominant perennials in the remaining 11 creosote bush scrub communities included burrobush (*Ambrosia dumosa*) at 10 (91%) sites and Cooper's goldenbush (*Ericameria cooperi*) at 1 (9%) site. Burrobush was also the most abundant perennial species at 2 (40%) of the 5 sites characterized as saltbush scrub.

LaRue characterized substrates at the 19 sites as "sandy" for 16 sites (84%) and "rocky" for the remaining three sites (16%). This is consistent with numerous reports in the literature, and with observations for the other 1998 survey sites.

The abundance and diversity of annual plants is directly related to the amount and timing of rainfall and temperature. Although rainfall data were not analyzed for Aardahl-Roush's trapping effort in 1985 or for LaRue's in 1998, the numbers of annual plants were similar. Aardahl and Roush reported between 12 and 33 annual plant species (average of 22 species) on their 19 sites, compared to between 3 and 38 species (average 19.5) on the 102 sites where MGS has been observed; there were between 7 and 47 species (average 23 species) in previously-identified medium and high quality habitats.

Ord-Rodman Winterfat and Hopsage Survey (1998): During the 1998 survey, 34 transects were surveyed in the Ord-Rodman mountains area to see if winterfat and hopsage may be associated with MGS occurrence (LaRue, 1998 unpublished data). This area is to the south, east, and northeast of the known. Either winterfat and/or hopsage were found on 14 (41%) of the 34 transects. These 14 sites were associated with (from west to east) Highway 247 in Stoddard Valley, Highway 247 in Lucerne Valley (to south of Cougar Butte), and along Camp Rock Road (both north and south of the bend that is located east of the Maumee Mine). Neither species was found on the 11 eastern-most transects, which were surveyed along Bessemer Mine and Box Canyon roads between Highway 247 and the Rodman Mountains. These data are insufficient to conclude that winterfat and hopsage are uncommon or absent from the region, but they appear to be less common in the survey areas as one proceeds to the east.

Neither winterfat nor hopsage were as common as they were on the 48 high abundance transects found within the range. When the numbers of winterfat and hopsage are combined for the Ord-Rodman area, only 1 (3%) of the 34 transects had more than 100 individuals (158 plants were observed on one transect located along Camp Rock Road, south of the Newberry Mountains). Two adjacent transects had the next highest combined counts of 81 and 68, and were located within several miles of each other, along Highway 247, several miles west of Bessemer Mine Road.

As such, only 1 (3%) of 34 transects surveyed in the Ord-Rodman area, outside the known MGS range, had more than 100 plants per transect, compared to 48 (15%) of 310 transects found within the range. It would appear, pending more study (particularly closer to the known range in western Stoddard Valley and Brisbane Valley), that winterfat and hopsage may be more prevalent within the known range.

3.3.3.4 MGS Associations with Regional Plant Communities

As of July 2002, the CNDDB listed locations for 260 MGS occurrences; 252 of these are within the range and 8 are just outside; one of these is five or six miles east of Barstow, and was probably a round-tailed ground squirrel that was misidentified. Only the 252 records within the range are included in the following discussions. When these occurrences are compared to the

1996 vegetation map[29] within the range, one finds that MGS occurrences are directly proportional to the prevalence of plant communities. Table 3-34 compares the occurrence of MGS sightings to the prevalence of each plant community within the range.

Table 3-34
Occurrence Of 252 Mgs Records With 16 Plant Communities

PLANT COMMUNITY	NO. AND PERCENT OCCURRENCE OF MGS	PERCENT OCCURRENCE OF COMMUNITY WITHIN MGS RANGE
Mojave Creosote Bush Scrub	136 (53.96%)	53.97%
Desert Saltbush Scrub	50 (19.84%)	19.84%
Mojave Mixed Woody Scrub	22 (8.73%)	8.73%
Urban	15 (5.95%)	5.95%
Agriculture	9 (3.57%)	3.57%
Blackbush Scrub	4 (1.58%)	1.59%
Mojave Desert Wash Scrub	4 (1.58%)	1.59%
Hopsage Scrub	3 (1.19%)	1.19%
Shadscale Scrub	2 (0.79%)	0.79%
Alkali Seep	1 (0.39%)	0.40%
Desert Sink Scrub	1 (0.39%)	0.40%
Greasewood Scrub	1 (0.39%)	0.40%
Mojave Wash Scrub	1 (0.39%)	0.40%
Mojavean Juniper Woodland	1 (0.39%)	0.40%
Playa	1 (0.39%)	0.40%
Ruderal	1 (0.39%)	0.40%
Total	100%	100%

These data show remarkable similarities between MGS occurrence (locations collected since 1886) and the prevalence of plant communities (determined in 1996) within the range. In fact, the percent occurrence of MGS and plant communities is exactly the same (two points right of the decimal point), even though these are independent data sets! These comparisons clearly indicate that the MGS is a generalist in terms of plant community preference; it is neither restricted to nor concentrated within any of the 16 plant communities where it has been reported; its occurrence is directly proportional to the occurrence of plant communities.

These are very important findings with regards to MGS conservation. Historically, the MGS was equally likely to occur in the 12 native plant communities (i.e., excluding Agriculture, Ruderal, and Urban communities, which are of recent origin, and Playa, which is likely an artifact of the analysis, or the animal may have been dispersing). Although true that one cannot differentiate between resident and dispersing MGS, these observations suggest that the 12 native habitats within the range are equally important to support both resident adult animals and dispersing juveniles.

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29 The vegetation map used throughout Chapters 3 and 4 of this document was developed in 1996 by Tom and Debi Clark. U.S. Bureau of Land Management 2000 describes the fieldwork and methods used to develop this map. Although it likely has some inaccuracies, and lacks the resolution of other recent vegetation community mapping projects (e.g., at 29 Palms Marine Corps Base, Fort Irwin, and Edwards AFB), it represents the best scientific information available for the planning area.

There were no MGS occurrences in 28 of the 44 plant communities occurring within the planning area. When combined, however, these 28 plant communities comprise only 7.4% of the planning area, and are generally outside the known range. Three of the 28 plant communities, which comprise 4.2% of the 7.4%, are either not habitat (Playa at 1.7%) or mostly occur above the elevation range of the MGS (Semi-Desert Chaparral at 1.4% and Mojavean Pinion Juniper Woodland at 1.1%).

The analysis also provides one means of measuring the relative impact of urbanization and agricultural development on historically occupied habitats. Recall that the data have been collected since 1886, and the "vegetation communities" given above were derived in 1996. Therefore, the communities include both native plant communities and type-converted communities (i.e., native habitats that have recently been replaced by manmade communities). As such, *Urban* communities currently occupy about 6% and *Agriculture* communities occupy about 4% of the historical MGS range. Excepting a few anecdotal accounts of MGS in such areas (see below), these data suggest that about 10% of the native habitat has been converted to urban and agricultural uses, which are ultimately not suitable for the species (Laabs 1998).

3.3.3.5 Threats

This section provides a general discussion of threats and impacts that have been given in the literature, and includes recent data for comparison. Except for the first section, which describes human disturbances observed during the 1998 survey, the threats are presented in alphabetical order (as opposed to severity or importance of a given threat).

Human Disturbances Observed During 1998 Vegetation Studies: During the 1998 survey, biologists collected information on human disturbances observed along each of 310 transects, including those located near previous MGS reports (102 transects) and those located in high and medium quality habitats (208 transects). Table 3-35 indicates the prevalence of disturbance types found along these transects[30].

[30] "OHV" refers to cross-country vehicle tracks, which were created by trucks, motorcycles, and all-terrain vehicles. "Road" includes trails, and usually included routes passable by trucks. Sheep, cow, and dog sign were usually feces. "Guns" does not differentiate between legal activities (e.g., hunting, regulated target practice, etc.) and illegal ones (e.g., shooting glass and articles at dump sites). "Dumps" generally required a vehicle to off-load the materials, so does not include litter. "Mines" may have included pits and adits, exploratory excavations, borrow pits, etc. "Ord" refers to military ordnance, which typically included spent cartridges and clips from aircraft. Two transects occurred in areas previously burned. Most of the transects (237 of 310, 76%) were surveyed by LaRue, so subjective determinations among surveyors is not considered a significant problem.

Table 3-35
Prevalence of 10 Types of Disturbances
Observed within the Known Range of the MGS During the 1998 Survey

TRANSECTS			DISTURBANCE TYPES										
Total	Disturbances		OHV	Road	Sheep	Gun	Dump	Cow	Dog	Mine	Ord	Burn	Total
	None	Yes											
310	168	142	145	116	56	23	20	20	12	6	3	2	403
% of 310 transects			47%	37%	18%	7%	6%	6%	4%	2%	<1%	<1%	
% of 403 disturbances			36%	29%	14%	6%	5%	5%	3%	1%	<1%	<1%	

Surveyors found one or more disturbance categories on 142 (46%) transects, and none of the disturbances on 168 (54%) transects. The three most prevalent disturbances were cross-country travel on 145 (47%) of the 310 transects, roads on 116 (37%) transects, and sheep sign on 56 (18%) transects. Importantly, this represents another, independent data set showing the same relative levels of occurrence of these impact types. In an earlier table comparing impacts in DWMAs with urban areas, disturbances were reported for sign count data collected on 1,572 transects in the Fremont-Kramer and Superior-Cronese DWMAs between 1998 and 2002 (see tortoise section). In that independent data set, cross country travel was observed on 45% of transects (compared to 47% above), dirt roads on 53% of transects (37% above), and sheep sign on 13% of transects (18% above).

Agricultural Development: Gustafson (1993) estimated that approximately 39,000 acres (61mi^2) of MGS habitat had been affected by agricultural development. As reported above, about 4% of the historical MGS records occur in areas that have since been converted to agricultural fields. Agriculture could affect the MGS through conversion of habitat (and increase of non-native, weed species), exposure to pesticides and herbicides, and increases in California ground squirrel populations.

Agricultural development results in the elimination of habitat, but also the degradation of habitat, including the spread of invasive exotic weeds. Dr. Leitner has expressed concern that the prevalence of non-native annual plants south of Highway 58 could adversely affect MGS habitat (pers. comm., 2002). In 1972, Hoyt observed that in some areas the MGS seemed to be feeding extensively on alfalfa; a state rodent control program may have adversely affected populations (Gustafson 1993). In a letter from Jeff Aardahl, Gustafson (1993) reports that the Los Angeles Agricultural Commission systematically eliminated unspecified ground squirrel species from the Antelope Valley by spreading out poisoned grain; no date was cited for when this program occurred. No data are available for the prevalence of the California ground squirrel within the range, although it is mostly restricted to agricultural and urbanizing areas.

Grazing: Laabs (1998) indicated that grazing by livestock might affect the MGS through direct competition and changes in vegetative structure. At the Coso study area, overlap in the forage consumed by the MGS with that consumed by both sheep and cattle has been demonstrated (Leitner and Leitner 1996; Leitner et al. 1997). Competition for shrubs such as winterfat and spiny hopsage could be exacerbated during times of drought because alternative sources of food are not available (Laabs 1998). Grazing may lower the availability of annual herbaceous plants to the MGS. There is also evidence that cattle and sheep preferentially select

certain shrubs (e.g. winterfat) that are important in the MGS diet (Leitner and Leitner 1996) (Leitner *et al.* 1997).

Gustafson (1993) indicated that, at that time, grazing was permitted on approximately 2,106,000 acres (3,290 mi^2) of military and BLM lands within the known range. BLM authorized cattle grazing on approximately 761,000 acres (1,189 mi^2) and sheep grazing on 592,000 acres (925 mi^2) of potential MGS habitat (see Appendix M for a list of cattle and sheep allotments within the known range of the MGS, and a discussion of cattle grazing outside of BLM allotments). Cattle may wander up to several miles beyond designated allotment boundaries (see Appendix M).

A total of 1,517,262 acres (2,370 mi^2) of BLM sheep allotments are actively being grazed within the known range, including 897,820 acres (1,403 mi^2) of public lands and 619,442 acres (968 mi^2) of private lands. On private lands, woolgrowers, or landowners giving them permission, are required to obtain federal Section 10(a) permits if their activities are likely to result in the take of tortoises. To date, there have been no such permits issued for sheep grazing. There is no discretionary action required by county or city jurisdictions for grazing on private lands, so consequently there is no clear means of regulating this impact on private lands outside sheep allotments.

There are no region-wide data to show the incidence of sheep grazing that is not associated with BLM allotments. However, because there exists the potential to graze in these areas, the total sheep grazing area given above likely underestimates actual sheep grazing within the known range.

Gustafson (1993) indicated that cattle may adversely affect the MGS by trampling and collapsing burrows, and that sheep may compete for limited annual forage and severely trample local areas. Sheep are generally grazed in the desert between late February and the middle of June (Gustafson 1993), which coincides with MGS emergence from hibernation (February) and the entire activity period, particularly during very dry years when the MGS may enter hibernation in June. These are critical times for both adult and juvenile MGS to attain sufficient fat reserves to enter and successfully emerge from hibernation. The severity of impacts may range from marginal in lightly used areas to extreme at cattle troughs and sheep bedding areas. No consolidated data are available concerning the spatial locations of these impacts.

Hybridization between Round-tailed Ground Squirrels and the MGS: Hybridization results when two different species interbreed to produce progeny that has genetic traits of each species. Physiological, behavioral, and geographical barriers generally segregate two species. Physiological barriers, such as incompatible genitalia, different mating seasons (which also suggests behavioral segregation), and similar biological factors tend to remain the same, pending evolutionary pressures. Geographical barriers may also take a long time to change (measured in geological time frames), as is the case with the gradual disappearance of lakes that were prevalent in the Pleistocene. However, some changes in habitat (often referred to as "type conversion") can occur in an instant, as when a parcel is bladed, or during several human generations (e.g., spread of agricultural development).

Both agriculture and mechanized military maneuvers have resulted in a gradual trend from coarser to finer substrates (Krzysik 1994; LaRue and Boarman, in prep.). When the natural vegetative cover is removed for agricultural (and other) purposes, the soil is far more susceptible to wind erosion than if left undisturbed. The potential problem with converting relatively coarse substrates to finer materials is that the MGS tends to prefer the coarser materials, compared to the round-tailed ground squirrel, which prefers sandier substrates (Hafner and Yates 1983).

Gustafson (1993) reports that the contact zone between the two species is approximately 240 km (149 miles) between northern Fort Irwin and Victorville, with the Mojave River in between. MGS-round-tailed hybrids have been observed in the Helendale area (Wessman 1977; LaRue, pers. obs. 1997), adjacent to the Mojave River, and much of the river basin has been converted to agricultural fields (WMP data). Although agriculture is not likely to significantly expand outside the Mojave River, the Fort Irwin expansion would extend west into the known range of the MGS. If similar impacts are observed in the expansion area as has been documented on the existing installation (i.e., conversion of gravelly soils to sandier soils; Krzysik 1994), there is the potential for expanding preferred round-tailed ground squirrel habitat and reducing MGS habitat. If so, the potential for hybridization between the two species will be facilitated where it presently may not occur.

The only occurrences of hybrid (Wessman 1977) and suspected hybrid (Krzysik 1994; LaRue, 1997 pers. obs.) ground squirrels have been in the areas of Fort Irwin and Helendale. Gustafson (1993) reported that hybridization likely occurred in these areas due to ecological and behavioral changes in one or the other species that resulted from agricultural disturbances in the Helendale area and military maneuvers at Fort Irwin. Dr. Recht (2001 pers. comm.) has recently trapped the round-tailed ground squirrel in the Superior Valley, 10 or more miles inside the known range of the MGS. This suggests that there is potential for hybridization to occur well into the known range, and not just along the edges.

Gustafson (1993), citing Hafner (1992) discussed the low vagility (the potential for an animal to disperse) of the MGS, which results, in part, from the species being active for only three to four months of a given year. Hafner (1992) concluded that low dispersal potential, on the local population level, may be on average about 5 m per year, and that this low vagility would preclude the MGS from rapidly expanding into suitable habitats where it was previously extirpated. Since that time, the Leitners have found that juvenile MGS may disperse up to four miles from their natal burrows in a given year. So, although dispersal abilities may be more pronounced than previously thought, the quality (including sandiness) of habitat may still limit recolonization potential.

Military Maneuvers: Military maneuvers may affect the MGS through direct mortality, crushing burrows (and animals within them), or decreasing shrub cover (Laabs 1998). Krzysik and Woodman (1991) reported that coarse-grain soils were pulverized by mechanized equipment at Fort Irwin. Army maneuvers in the main corridors caused a reduction in the particle size, which led to dust storms and reduced human visibility to within several meters. China Lake NAWS reported that opening the Mojave B Range to Army maneuvers would create so much dust (which they compared to that blowing south out of the Owens Valley) that the Navy's mission would have been compromised by this use (Range Systems Engineering Office and

NAWS China Lake 1993). As discussed above, there is concern that sandy habitats resulting from new Army maneuvers in the Superior Valley may favor round-tailed ground squirrels at the expense of the MGS, which tends to prefer relatively coarser sands. Gustafson (1993) also noted that the residential areas of Edwards AFB, China Lake, and Fort Irwin (often referred to as cantonment areas) directly and indirectly affect MGS.

Military maneuvers and their observable impacts vary dramatically. Edwards AFB has cantonment areas west of Rogers Dry Lake, and logistical support facilities occur west of Rogers and east of the northern end (Leuhman Ridge facilities) that have resulted in MGS habitat loss. China Lake has a limited cantonment area (Ridgecrest serves that function) and office area, so support facilities have resulted in minimal impacts to either the northern or southern ranges. Given that both installations practice air-to-ground maneuvers, with limited day-to-day ground disturbance, most of the habitats are still intact and potentially occupied.

At Fort Irwin, mechanized vehicles and ground troops create new ground disturbances during each exercise (albeit in previously degraded areas). Gustafson (1993) reported that military training had affected approximately 130,000 acres (203 mi^2) in the known range. Most of the impacts are limited to areas below about 20% slope (LaRue and Boarman, in prep.), which coincides with the substrates most preferred by the MGS, where about 90% of 102 MGS records have occurred (LaRue, 1998 unpublished data). Approximately half of Fort Irwin [i.e., 353,644 acres (552 mi^2) of the 1,000 mi^2] installation within the MGS range is below 20% slope, and is therefore susceptible to some of the heaviest maneuver impacts. Krzysik and Woodman (1991) noted heavy shrub losses from the main maneuver corridors at Fort Irwin.

"Natural" Predators: Recently Dr. Leitner (pers. comm. 2000) indicated that common ravens might also prey on the MGS, although the evidence is anecdotal. He indicated that ravens are known to prey on Townsend's ground squirrels. In their Coso studies, the Leitners have found radio collars of several of their study animals at known raven perch sites. The extent of raven predation on the MGS is unknown. Although ravens are identified as a "natural" predator, they have also been referred to as a "subsidized predator" (Boarman 1993), and would probably not occur at current population levels in the absence of human resources. No data were found in the literature to indicate to what extent other predators (e.g., raptors, kit fox, coyote) may prey on the MGS.

Off Highway Vehicles: Off-highway vehicles may pose a threat to the MGS by crushing individuals or burrows, and degrading habitats (Gustafson 1993, Laabs 1998). With time, the plant diversity and abundance decreases in areas with intense OHV use (Laabs 1998), which reduces cover needed by the species for shade and forage. Gustafson (1993; citing Bury and Luckenbach 1977), reported that even light OHV use in the Mojave Desert can result in lost or compacted topsoil, unavailability of seeds for birds and mammals, and disrupted soil mantles. Gustafson (1993) reported, "...it is known that the squirrel is run over by vehicle[s]," but did not provide any specific reports.

There is anecdotal evidence that the MGS may be killed on both paved and dirt roads, although it has been suggested that they are too quick for this to happen. For example, during tortoise surveys conducted near Water Valley, northwest of Barstow, in 1998, LaRue crushed a

juvenile male MGS on a dirt road as it attempted to cross in front of his truck. In 1997, LaRue observed a juvenile male (likely a hybrid) as it was crushed on National Trails Highway, several miles north of Helendale. One of the nine MGS observed in 1998 (LaRue, unpublished data) darted into burrows that were located in the berms of a dirt road. The juvenile female was observed for about 20 minutes eating cryptantha alongside the road, and later using two different burrows located in berms on opposite sides of the road. Recht (1977) also observed MGS feeding on Russian thistle that was congregated along shoulders of roads in northeastern Los Angeles County.

Goodlett and Goodlett (1991) have shown, in the Rand Mountains, that the heaviest vehicle impacts occur immediately adjacent to both open and closed routes. It is plausible, then, that individual MGS using resources adjacent to roads are more likely to be in harm's way than those animals occurring in roadless areas. It is also plausible that juvenile MGS, which are most likely to travel longer distances than adults, are somewhat more susceptible to vehicle impacts than adults. Although adults may still be susceptible to vehicle impacts within their somewhat-fixed home ranges, dispersing juveniles are likely to encounter more roads than an adult living within a fixed region.

The potential to crush squirrels likely increases as the prevalence and use of roads increases in a given region. Given the relatively higher incidence of cross-country travel in open areas (1998-2001 WMP data), vehicle impacts are more likely to occur there and other places with similar densities of cross-country tracks, depending on resident and dispersing populations of the MGS. This would suggest that there may be relatively more impacts in the Spangler Hills, Jawbone Canyon, Dove Springs and El Mirage open areas, which occur within the range, but does not negate the possibility that impacts may also be prevalent in heavy OHV use areas, such as occur in the vicinity of "Camp C" near the western end of the Rand Mountains.

In Table 3-36, incidences of six vehicle-based disturbances observed between 1998 and 2002 are compared between designated open areas and one heavy use area, between California City and the Rand Mountains. The first table lists data for trails, tracks, and litter; followed by targets, hunting, and camping in the second table.

The tables document the types of heaviest vehicle-based impacts observed within the range of the MGS in three open areas (excluding Olancha, which was not surveyed) and one hevy OHV use area. All vehicle-based impacts in these areas were above average, as described in the tortoise section. The data include vehicle impacts both inside and outside the open areas, the latter of which are clearly associated with the vehicle impacts emanating from open areas (see Map 3-14).

One can see that the Spangler Hills Open Area had the highest incidences of trails (19.3/mi^2 compared to 16.9/mi^2 at the next highest incidence at El Mirage), litter (39.1/mi^2 compared to 21.0/mi^2 at El Mirage), and target shooting (18.0/mi^2 compared to 17.6 at Jawbone Canyon/Dove Springs). El Mirage had the highest incidence of cross-country vehicle tracks (at 120.7/mi^2 compared to Spangler Hills at 95.6/mi^2) and hunting areas (2.3/mi^2 compared to 1.5/mi^2 in the heavy OHV use area).

Cumulatively, one finds there to be 274 mi^2 affected by above average trails, 324 mi^2 impacted by tracks, 319 mi^2 by litter, 160 mi^2 by target shooting, 38 mi^2 by hunting, and 25 mi^2 by camping. Tracks and trails are most likely to affect the MGS, as shooting has not been identified as a direct threat to the species. These impacts were most prevalent in the open areas, where this sort of activity will likely remain or increase under present and future management on these class I lands.

Table 3-36
Prevalence of Vehicle-Based Disturbances in Four Areas of Comparison

AREA	SQUARE MILES, SUM, AND AVERAGE VEHICLE-BASED DISTURBANCES OBSERVED (1998-2002) IN THREE OFFICIAL AND HEAVY USE AREA								
	Trails			Tracks			Litter		
	Mi^2	Sum	Ave	Mi^2	Sum	Ave	Mi^2	Sum	Ave
Spangler	121	2336	19.3	127	12140	95.6	121	4734	39.1
El Mirage	19	322	16.9	19	2294	120.7	20	437	21.9
Jawbone/Dove	24	370	15.4	22	406	18.5	22	381	17.3
Cal. City/Rands	110	878	8.0	156	8162	52.3	156	3295	21.1
Totals	274	3906	14.3	324	23002	71.0	319	8847	27.7

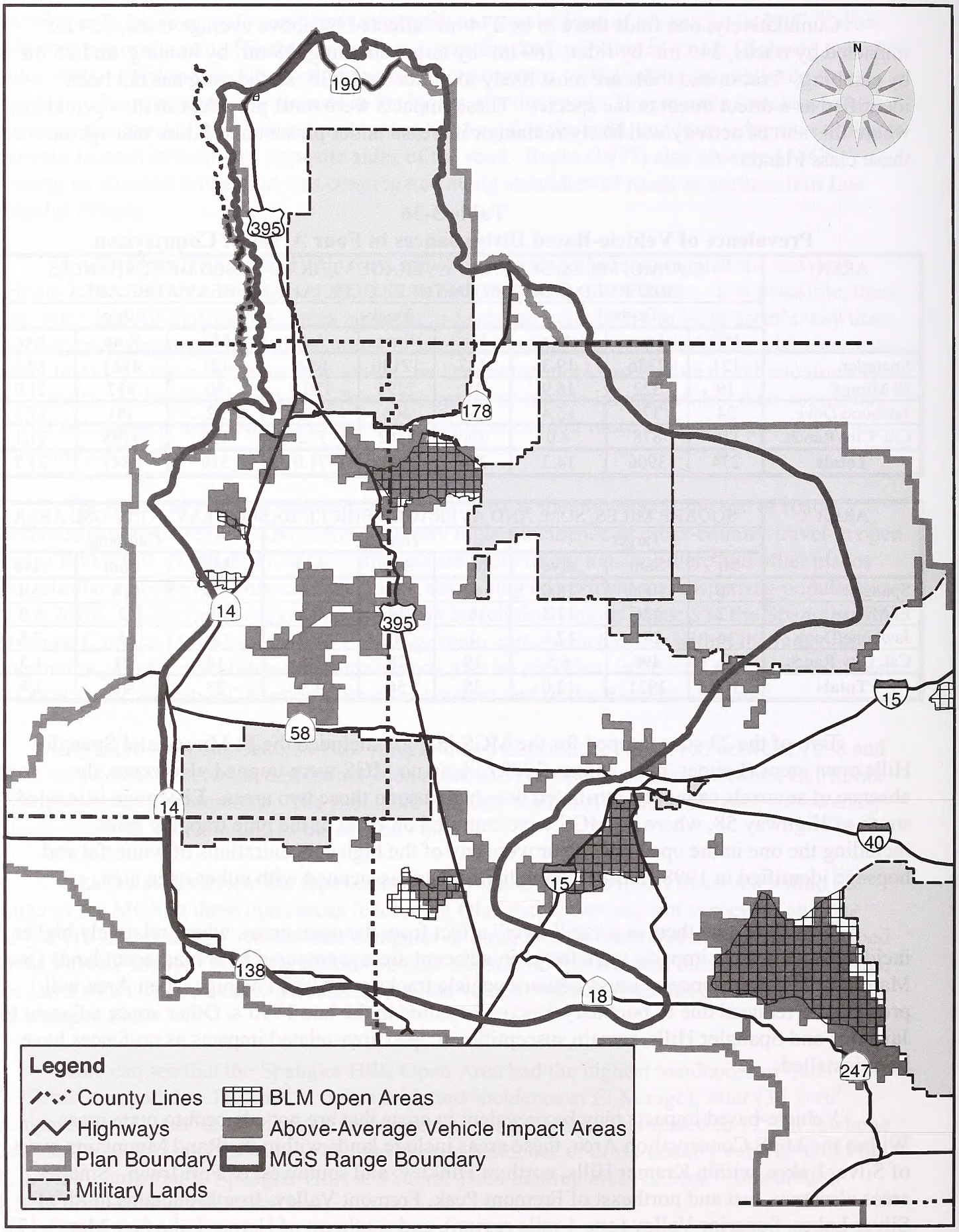
AREA	SQUARE MILES, SUM, AND AVERAGE VEHICLE-BASED HEAVY OHV USE AREA								
	Target			Hunting			Camping		
	Mi^2	Sum	Ave	Mi^2	Sum	Ave	Mi^2	Sum	Ave
Spangler	56	1006	18.0	12	13	1.1	7	18	2.4
El Mirage	12	136	11.3	6	14	2.3	2	2	1.0
Jawbone/Dove	16	281	17.6	1	1	1.0	2	5	2.5
Cal. City/Rands	76	498	6.5	19	28	1.5	14	21	1.5
Totals	160	1921	12.0	38	56	1.5	25	46	1.8

Two of the 23 sites trapped for the MGS in 2002 included the El Mirage and Spangler Hills open areas (Leitner, pers. comm. 2002) where no MGS were trapped. However, the absence of squirrels cannot be attributed to vehicle use in those two areas. El Mirage is located south of Highway 58, where no MGS were captured on eight of the nine trapping grids, including the one in the open area. Nor were any of the high concentrations of winterfat and hopsage identified in 1998 (LaRue, unpublished data) associated with either open area.

Data show that there is a "spill-over" effect from the open areas, where relatively higher incidences of vehicle impacts were found in adjacent areas, compared to non-adjacent lands (see Map 14). The prevalence of cross-country vehicle tracks north of El Mirage Open Area will probably be reduced due to boundary fencing installed in the late 1990's. Other areas, adjacent to Jawbone and Spangler Hills, remain susceptible to open area-related impacts as no fences have been installed.

Vehicle-based impacts may be prevalent in areas that are not adjacent to open areas. Within the MGS Conservation Area, these areas include lands within the Rand Mountains, west of Silver Lakes, within Kramer Hills, north of Hinkley, and southwest of Fort Irwin. Smaller areas also exist east and northeast of Fremont Peak, Fremont Valley, Iron Mountains north of Silver Lakes, Superior Valley (one 4-mile region), and southeast of Harper Lake (see Map 3-17).

Vehicle Disturbances and MGS Habitat



West Mojave Plan FEIR/S
Map 3-17

Scale: 1 : 1,250,000
0 10 20 30 Km
0 10 20 30 Miles

7/29/04

Citing Bury and Luckenbach (1977), Gustafson indicated "One result [of OHV activity] is a reduction in the number of spring annuals in areas of off-highway vehicle use" and "...off-highway vehicles detrimentally affect wildlife and creosote bush scrub habitat in the Mojave Desert." Brooks (1999a, 2000) found non-native plant species were more common alongside roads, and that roads served as dispersal corridors for weed species. Weeds, in turn, provide fuels that result in hotter fires and relatively larger burned areas. Non-native annuals serve to spread fires between shrubs far more readily than the native annual flora (Brooks 1999b). Gustafson (1993) indicated wildfires are probably hot enough to kill seeds, sprouting shrubs, and squirrels within their burrows. He felt this was a temporary impact that would be remedied when vegetation became re-established.

Urban Development: According to some authors, the primary threat to the MGS is destruction and degradation of its habitat (Laabs 1998, CDFG 1992). Habitat conversion not only decreases the amount of available habitat, it also fragments the remaining habitat, isolating populations from one another. Urbanization has resulted in the loss of considerable habitat, particularly surrounding the cities of Palmdale, Lancaster, Victorville and Hesperia. Urban development results in the direct loss of habitat, and likely has effects on surrounding native habitats, including increased numbers of domestic and feral cats and dogs. Dumping of refuse, abandoned vehicles, and other items is often most prevalent on undeveloped lands adjacent to residential, commercial, and industrial development (Gustafson 1993; WMP data).

Gustafson (1993) concluded: "No single small development threatens the squirrel's existence in the region, but the total cumulative impact is greater than the sum of the individual impacts." He reported approximately 165,000 acres (258 mi^2) of urban development and 215,000 acres (336 mi^2) of rural development occurred within the known range as of the early 1990's. Numerous historic localities for the MGS are in areas that have been converted to urban uses. For example, about 10% of the historic MGS range has been lost to urban (6%) and agricultural (3%) uses.

The MGS is not absent from all urban areas. A recent observation occurred south of Highway 138, near Pinyon Hills, and a second occurred near an aerospace industrial complex located adjacent to Palmdale (Becky Jones, pers. comm., 2002). In the first case, the site and adjacent areas are comprised of extensive tracts of undeveloped lands and those with relatively light rural development. At the second site, there are about five to six contiguous square miles of relatively undeveloped land, but the entire area is surrounded by urban and agricultural development.

The MGS has also been observed in residential backyards in Inyokern (Peter Woodman, 2000 pers. com.), and may be seen foraging on the golf course at China Lake (Tom Campbell, pers. comm., 2002). In 1991, Laabs (Tierra Madre Consultants, Inc. 1991) tentatively identified an MGS burrow in the edge of an agricultural field in northeastern Lancaster. One squirrel was recently trapped at the proposed Hundai facility south of California City, where the consultant had identified habitats as being marginal (Michael Connor, pers. comm., 2002). In these latter cases, the sightings are adjacent to extensive areas of undeveloped lands.

Given these observations, the only certain areas of MGS extirpation within the range are those that have been physically developed. Such areas include, but are not limited to, paved roads and parking lots; residential, commercial, and industrial sites occupied by buildings, graded areas, and other areas where vegetation has been mechanically removed; solar facilities at Kramer Junction and Harper Lake; and large mined areas (U.S. Borax, Rand Mining Company, portions of the Shadow Mountains located east of Edwards AFB).

Although urbanization and its affiliated impacts are prevalent in the Palmdale/Lancaster and Victorville/Apple Valley/Hesperia areas (Aardahl and Roush 1985), other communities within the range (e.g., Ridgecrest, California City,.) are also likely affecting MGS habitats. Whereas the MGS has been observed at the edge f urbanization (e.g., Barstow, China Lake golf course), it is unlikely that the species can persist for long in urban settings (Laabs 1998). Potential causes for the likely extirpation of the MGS from Lucerne Valley have included agricultural development (Laabs 1998) and the expansion of the California ground squirrel (*Spermophilus beecheyi*) in the area (Wessman 1977). The isolation of MGS in Lucerne Valley from the main portion of its range, located west and north of the Victor Valley, has also been cited (Gustafson 1993).

Uncertainties with the MGS That Do Not Affect the Desert Tortoise: There are significant differences, in terms of detectability and distribution, between the tortoise and the MGS that warrant brief mention.

- **Detectability:** The tortoise leaves behind evidence (scats, burrows, tracks, carcasses, courtship rings) that allows for detection that is not available with the MGS. Tortoise carcasses and fragments may persist for as many as 20 years, and still allow for positive identification. This is not true for the MGS. As such, it is relatively straightforward to determine occupied (or recently occupied) tortoise habitat. MGS detection, by contrast, relies on either observing or trapping animals, or occasionally finding road-killed squirrels. For these reasons, nothing comparable to the relatively accurate tortoise range map could be developed for the MGS without a focused trapping survey. Even the 1993 range reduction (Gustafson 1993) was based more on anecdotal information than on substantiated absence of the MGS west of Highway 14, in the Antelope Valley.

- **Records:** MGS records have been maintained for more than 100 years. This historic information is not available for the tortoise, for which records have only been available since the mid-1970s (except for anecdotal accounts). This is critically important, as it allows for a MGS range map that shows both historical and current distribution, even though current distribution cannot be fully ascertained based on available data. Given these data, it is possible to determine what percent of the known and historic range has been converted to urban, agricultural, and other uses.

- **Current Distribution:** It cannot be emphasized enough that *the entire known range of the MGS occurs within the West Mojave*; all but a small part of that, which is located northeast of Searles Dry Lake, *occurs within the planning area, west and north of the Mojave River*. The tortoise occurs in four different states on millions of acres, whereas

the MGS is restricted to about 7,000 mi^2. The literature indicates that this is the smallest range for any full species of mammal in the United States.

Although it is not possible to produce a relatively accurate range map for the MGS, this problem is somewhat alleviated by available data. Several different studies corroborate the hypothesis that the MGS is a generalist, equally likely to occur in creosote bush scrub as in saltbush scrub. Its distribution is likely restricted by elevation limits (i.e., probably not above about 5,600 feet) and geomorphologic factors (i.e., absent from non-vegetated playa surfaces, and likely less common on steep, rugged terrain, although young MGS may disperse through such areas).

Implications for Conservation Strategy: Given this lack of information, any conservation strategy must necessarily rely on protecting as much quality habitat within the range as possible, regardless of current occupancy. Available data suggest that local MGS populations follow a "boom and bust" cycle, where they expand into habitats when conditions are favorable, and shrink back into core areas when conditions are less favorable, particularly when conditions such as drought occur over a several-year period. Therefore, one critical difference between conservation of the tortoise and that of the MGS is that *proactive conservation measures for the MGS must be applied to its habitat; they cannot be applied to animals only, and still succeed.* MGS conservation requires that a substantial portion of its known range is protected to allow for natural fluctuations in local and regional populations in response to climatic factors, particularly wetter and drier conditions.

3.3.3.6 Regulatory Protection of the Mohave Ground Squirrel

As a State-listed species with no federal status, there is limited regulatory protection for the MGS compared to the tortoise. For example, although tortoise management programs at Edwards AFB and China Lake minimize habitat loss and degradation of MGS habitat, the Air Force and Navy are not obligated to manage the installations to preserve State-listed species. The CDFG has no habitat designation that is analogous to federally designated critical habitat.

Even so, CDFG works closely with county and city jurisdictions to ensure that habitats are assessed for potential impacts to the MGS. CDFG is also given the opportunity to review base management plans for the three installations within the known range. Currently, private proponents must trap a proposed development site to confirm absence of the MGS, or assume presence, obtain a 2081 incidental take permit, and mitigate and compensate accordingly.

MGS also receives protection in several existing parks, wilderness areas, and BLM crucial habitat areas within the known range. These areas are managed in such a way that one or more known impacts to squirrels and habitats is somewhat minimized. For example, none of the areas discussed below is likely to be developed for either urban or agricultural uses. These lands constitute the most protected areas (outside military installations) within the known range. However, none of them is completely isolated from potential impacts to squirrels and habitat either. These areas include the following:

- **Red Rock Canyon State Park:** This 14,489-acre (22.6 mi^2)state park is located in the west-central portion of the known range. No grazing is allowed. There are centralized locations accommodating an unknown number of visitors each year, and remaining areas that are only accessible to foot traffic. The park is situated adjacent to the Dove Springs Open Area, and is therefore vulnerable to impacts from OHV traffic. Management actions have recently been implemented to minimize OHV impacts in the park.
- **Saddleback Butte State Park:** This 2,795-acre (4.4 mi^2) state park is located within the known range near its south-central boundary. The entire site is fenced, which minimizes direct impacts associated with OHV activity and grazing, both of which are prevalent in the region (LaRue, 2002 unpublished data). The community of Lake Los Angeles occurs several miles to the south, and individual residences are immediately adjacent to the east and north. Dogs and cats are both likely to affect any squirrels that may occur.
- **Desert Tortoise Research Natural Area:** The 25,695-acre (40-mi^2) DTNA is cooperatively managed by the BLM and the Desert Tortoise Preserve Committee (DTPC) for desert tortoise conservation, which should also benefit the MGS. For example, DTPC has conducted an aggressive land acquisition program to acquire private inholdings. The DTNA is completely fenced. The fence precludes sheep grazing, which is prevalent on the surrounding lands. Occasional OHV trespass occurs when the fence is cut, but this is generally limited to one or several passes by the perpetrator. Sign count data indicate that tortoises within the fenced area are reproducing, but few subadult tortoises were observed in the larger, surrounding region. This suggests that the tortoise population receives protection within the fence that would also extend to the MGS, which like the tortoise, is exposed to extreme levels of sheep grazing and cross-country OHV travel outside the fence.
- **BLM Wilderness Areas:** As shown in Table M-11 (Appendix M), there are a total of 18 wilderness areas within then WMPA, which encompass 430 mi^2 within the MGS range. Six wilderness areas (274 mi^2) are fully within the range, five (478 mi^2 total) are partially within the range (156 mi^2 are inside), and seven (604 mi^2) are fully outside the range. One (Malpais Mesa) is outside the WMPA, but partially within the range. Although these areas are designated roadless areas, vehicle trespass occurs and some areas (Golden Valley) are grazed by sheep. Other uses, such as agriculture and urban development, are precluded (see discussion in tortoise section for characteristics of these wilderness areas and impacts that continue to occur).

Other BLM Special Management Areas: The 1980 CDCA Plan established three management areas for MGS: Rose Valley Western Mojave Crucial Habitat, and Superior Valley. The CDCA Plan also identified Crucial Habitat for the MGS, which occurred within the three MGS management areas and in two others as well: DTNA and Sierra-Mojave-Tehachapi Ecotone (see Table M-10, Appendix M). Cumulatively, these five areas encompassed about 773,000 acres (1,208 mi^2), or about 16% of the 7,691 mi^2 range of the entire MGS range. The CDCA Plan's wildlife element identified management objectives, planned actions and implementation needs, which are also given in Appendix M.

Habitat Management Plans (HMPs) were to be prepared for each of the five areas, to be finished no later than 1987, with implementation occurring no later than 1989. Specific management actions varied, as did long term goals, but each of the five areas had the long-term goal of protecting, stabilizing, and enhancing resource values. During the early preparation of these HMPs, conflicts with some of the multiple use class guidelines were identified. Because an HMP, unlike an ACEC, cannot override multiple use class guidelines, it was determined that an HMP was not an effective tool for MGS management. Rather, a plan amendment would be necessary, to be implemented through the West Mojave planning process.

Rand Mountains Fremont Valley Management Plan: The BLM completed a Rand Mountains Fremont Valley Management Plan (Rand Plan) in August 1993 (U.S. Bureau of Land Management 1993), which included 65,020 acres (101.6 mi^2) of public lands 35 miles south of Ridgecrest and immediately north of California City. The area encompasses about 24,320 acres (38 mi^2) of previously designated MGS Crucial Habitat. The Rand Plan ranked the MGS as second only to the desert tortoise on its list of the most sensitive wildlife resources in the management area. The Rand Plan called for: (1) amendment of the CDCA Plan to reflect a proposed 13,120 acre (20.5 mi^2) expansion of the Rand ACEC and a BLM multiple use class change from class M to class L; (2) acquisition of private lands; and (3) a mineral withdrawal. To date, the CDCA Plan has been amended for the ACEC expansion and multiple use class change; acquisitions of private lands and mineral withdrawal have not occurred. Facilitating implementation of the Rand Plan is considered a high priority for MGS conservation in the West Mojave Plan.

3.3.4 Bats

Six species are addressed by the plan: long-legged myotis, California leaf-nosed bat, spotted bat, pallid bat, Western mastiff bat and Townsend's big-eared bat.

Life History: The California leaf-nosed bat and Townsend's big-eared bat are colonial cave dwellers thought to have declining populations. The California leaf-nosed bat is known to be dependent on desert wash foraging habitat near the roosts. The Townsend's big-eared bat is dependent on riparian habitat within five miles of the roosts.

The spotted bat and western mastiff bat are cliff dwellers. In desert habitats, pallid bats roost mostly in rock crevices, although they might be found in tree cavities, old buildings, under bridges, in caves and mine adits, and mud tubes when these istes are available. The long-legged myotis is primarily a tree-dweller occurring at higher elevations than those found in the planning area.

Population Status in the Planning Area: All except one of the identified significant roosts are on public (NPS and BLM) lands. The Dale Mining District in the Pinto Mountains, including portions of Joshua Tree National Park, contains many shafts and adits known to harbor bats of several species. Six significant roosts have been located, and the potential for several more is present. The largest roost known, containing over 10,000 bats of several species, is under the Interstate 15 bridge at the Mojave River crossing. This site is currently under

investigation. It may not be a significant roost for the six target species.

The only identified cliff roosts for spotted bat are within Red Rock Canyon State Park. No roosts of western mastiff bat have been located, but roosts are suspected within Joshua Tree National Park.

Regulatory Status: BLM sensitive (except long-legged myotis), California Species of Special Concern (except long-legged myotis).

Threats Affecting Bats: The most serious direct threats to bats are disturbances of hibernation and maternity roosts and destruction of roosting habitat, primarily old mines and natural caves. Old buildings and bridges also provide roosts for some species. Loss and degradation of foraging areas threatens certain species. Potential recreation impacts include access to significant roosts and degradation of foraging habitat for Townsend's big-eared bat and California leaf-nosed bat.

3.3.5 Other Mammals

3.3.5.1 Bighorn Sheep

Life History: Bighorn sheep were originally distributed from Baja California to Texas in the south to the Canadian Rockies in the north, with the eastern boundary reaching western Nebraska and the western boundary in California extending from Mount Shasta in the north to the crest of the central and southern Sierra Nevada to the Transverse Ranges and the east side of the Peninsular Ranges in the south. Traditional taxonomy dating back more than half a century broke bighorn sheep from the southwestern desert region into four subspecies, one of which, the Nelson Bighorn (*Ovis canadensis nelsoni*), included bighorn from the Transverse Ranges through most of the desert mountain ranges of California, including the West Mojave planning area, and adjacent Nevada and northern Arizona to Utah. Recent research indicates a lack of support for Cowan's (1940) desert subspecies and instead has found previously unrecognized north-south variation of the Nelson Bighorn. The transition between the southern (warm desert) and the northern (cold desert) forms occurs in the middle of the West Mojave planning area, with I-15 east of Barstow representing the approximate boundary. Within the West Mojave planning area no populations north of I-15 persist that have not been reintroduced or augmented with sheep from south of I-15.

Within the West Mojave planning area, 16 bighorn sheep populations are known to have existed as defined by mountain range complexes. Five of these 16 areas no longer contain populations, three have been reintroduced, and two have been augmented with sheep from another population. For the past decade, bighorn sheep populations in California have been viewed in a metapopulation context. Within the West Mojave planning area there are three metapopulations whose geographic boundaries are now formed by major fenced highways (I-15 and I-40) -- the south, central, and north Mojave Desert metapopulations (Torres *et al.*, 1994, 1996).

Basic to the biology of bighorn sheep is their agility on steep rocky terrain, an adaptation used to escape predators. Preferred habitat of bighorn is primarily on or near mountainous terrain above the desert floor.

Radio telemetry studies of bighorn sheep in various southwestern deserts, including the Mojave Desert of California, have found considerable movement of these sheep between mountain ranges. This is especially true of males, but also of ewes. Within individual mountain ranges, populations often are small. Levels of inbreeding could be high in such populations, but intermountain movements provide a genetic connection with a larger metapopulation, and this will counteract potential inbreeding problems.

Surface water is another element of desert bighorn habitat considered to be important to population health. Male and female bighorn sheep inhabiting desert ecosystems can survive without consuming surface water, and males appear to drink infrequently in many situations ; however, there are no known large populations of bighorn sheep in the desert region that lack access to surface water.

Population Status in the Planning Area: The majority of bighorn sheep herds are located on military bases, especially China Lake NAWS and Twentynine Palms MCAGCC. Additional populations are found in the Rodman and Ord Mountains (occasionally ranging west onto Sidewinder and Stoddard ridges), Newberry Mountains, and on the north slope of the San Bernardino Mountains. Much of the habitat is within designated Wilderness.

Regulatory Status. BLM Sensitive.

Threats Affecting the Bighorn Sheep: Potential threats to bighorn include loss or disturbance of springs and waterholes, incremental loss of habitat, contact with domestic sheep that can introduce disease, and blockage of linkages by roads, canals, or fences. Significant mountain lion predation in the San Bernardino Mountains is a threat. Vehicle intrusion into occupied habitat, especially lambing areas, can be a minor threat.

Rural development with fencing threatens corridors; one corridor formerly extended through the city of Twentynine Palms. The bighorn traveling between the Pinto Mountains and the Bullion Mountains on Twentynine Palms MCAGCC now travel through the Sheephole Mountains (BLM, 2002). The dispersal corridor between the San Bernardino Mountains and the Granite Mountains is threatened by rural development in western Lucerne Valley. Mining operations have not been shown to significantly impact bighorn numbers in the San Bernardino Mountains, although the mines result in a loss of habitat, block access to water sources and pasture, and bring new disturbances into the permanent range. New cyanide heap leaching mines have the potential to harm bighorn if open water containing cyanide is present on operations within bighorn habitat.

3.3.5.2 Mojave River Vole

Life History. The Mojave River vole occupies moist habitats along the middle reaches of the Mojave River.

Population Status in the Planning Area: The range of this subspecies is entirely within the West Mojave planning area. It is found in wetland and riparian habitats along the Mojave River between Victorville and Helendale. Additional potential habitat lies upstream of Victorville towards Hesperia. Voles have been captured at Harper Lake, Edwards Air Force Base near Piute Ponds and Rogers Dry Lake, and at China Lake Naval Air Weapons Station. It is unknown which subspecies these specimens are.

Regulatory Status: BLM Sensitive, California Species Of Special Concern.

Threats Affecting the Mojave River Vole: Habitat destruction and fragmentation due to agriculture and urbanization are the primary threats. Concentrated off-highway-vehicle use and other surface-disturbing activities are also threats. Virtually all the potential habitat along the Mojave River, with the exception of the Mojave Narrows Regional Park, is in private ownership.

3.3.5.3 Yellow-eared Pocket Mouse

Life History: This mouse inhabits the eastern slopes of the Piute Mountains and Sierra Nevada along the western fringe of the Mojave Desert. Little information is available regarding habitat requirements except that it has been found in Joshua tree woodland, desert scrub, pinyon-juniper, mixed and montane chaparral, sagebrush and bunchgrass habitats. It occurs primarily in sandy soils with sparse to moderate shrub cover with elevations of known localities ranging between 1030-1615 meters.

Population Status in the Planning Area: Most of the range of the yellow-eared pocket mouse is within the West Mojave on the eastern slope of the Sierra Nevada and Piute Mountains. The species is known from Kelso Valley, Horse Canyon, Sage Canyon, Freeman Canyon, Indian Wells Canyon and Sand Canyon. Similar habitat, which may harbor the species, is present both north and south of this region, as well as in intervening canyons.

Regulatory Status: BLM sensitive.

Threats Affecting the Yellow-eared Pocket Mouse: Given the small range of the yellow-eared pocket mouse, any major disturbance of its known or suspected habitat could have significant deleterious effects. Cattle and sheep grazing pose a potential threat due to the effects on plant assemblages or erosion of soils. Off-highway vehicle activity and mineral extraction are other potential threats, due to their effects on native vegetation. Most of the canyons supporting the species have roads and are therefore accessible. Wind-energy production also poses a potential threat, resulting from impacts associated with road networks.

3.3.6 Birds

3.3.6.1 Bendire's Thrasher

Life History: This species breeds in desert areas containing cactus, Mojave yuccas, and Joshua trees.

Population Status in the Planning Area: The primary distrubution of Bendire's breeding habitat in the WMPA extends as a discontinuous band in suitable habitat from Joshua Tree National Park to near Victorville. The most extensive documented populations are in JTNP. The planning area comprises a small portion of the total range, which extends east to the east Mojave and Arizona. The historical range in the West Mojave was considerably larger than at present, and the occupied habitat in 1986 consisted of six disjunct populations: 1) Yucca Valley; 2) Kelso Valley; 3) Coolgardie Mesa; 4) Joshua Tree National Park; 5) SE Apple Valley; and 6) N. Lucerne Valley.

Surveys conducted in 2001 failed to detect Bendire's thrasher at most of these locations or at a control site in the east Mojave. Only Coolgardie Mesa and Joshua Tree National Park had nesting birds. The thrashers have been seen in abundance in the east Mojave in 2004.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Bendire's Thrasher: Identified threats include habitat destruction through rural and urban development, off-road vehicle activity during the nesting season, and removal of yuccas and cholla cacti. Grazing has shown both positive and negative effects on this species. Fragmentation of the small remaining populations is a serious long-term threat.

3.3.6.2 Brown-crested Flycatcher

Life History: This neotropical migrant occurs in riparian woodland or forest dominated by cottonwoods and willows, usually in a climax stage. The presence of woodpeckers or other cavity-excavating species is important. No data exist on the minimum area of riparian habitat required by brown-crested flycatchers.

Population Status in the Planning Area: In the western Mojave Desert, this species has nested at the following localities: the Mojave River at Victorville (1-3 pairs annually), Cushenbury Springs (one pair in 1991), and Morongo Valley (1-2 pairs annually). It was reported from Indian Wells Canyon June 18, 2001. Fifteen birds were seen in the Mojave River between Victorville and Helendale in 2000.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Brown-crested Flycatcher: Habitat destruction is the primary potential threat to brown-crested flycatchers in the western Mojave Desert. Habitat destruction can occur in several ways, with the most catastrophic losses resulting from clearing of large tracts of forest or woodland for agriculture, development, or flood control. Activities such as wood cutting for fuel or pumping of groundwater can degrade or destroy suitable breeding habitat for this species.

3.3.6.3 Burrowing Owl

Life History: This species is found in level grassland, prairie or desert floor habitat. It has adapted well to locations on the urban fringe, such as flood control channels or agricultural areas.

Population Status in the Planning Area: Existing records of burrowing owls include 53 records within the western Mojave Desert. These represent only a small sample of the locations at which burrowing owls have recently been or currently are present. Of the 53 records, 23 (43%) are from within Edwards Air Force Base; all of these have no specific locale or date. Of the other 30 records, only 13 have specific locales and dates. Probable or confirmed breeding was noted at five locales.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Burrowing Owl: Potential threats include direct mortality from man (including vehicle collisions– this species has a high tolerance for vehicle disturbance, but this causes high numbers of collisions), pesticide and rodenticide poisoning; habitat degradation, destruction and loss; and predators. Disturbance by vehicles at nest sites is a threat.

3.3.6.4 Ferruginous Hawk

Life History: The ferruginous hawk can be found throughout the West Mojave in winter, but it prefers agricultural areas where prey is relatively abundant.

Population Status in the Planning Area: The ferruginous hawk is relatively abundant in winter in the Antelope and Mojave Valleys, and is occasional elsewhere, such as at Mojave Narrows Regional Park. Harper Dry Lake has been identified by the BLM as a Key Raptor Area for ferruginous hawk.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Ferruginous Hawk: Electrocution on electric transmission and distribution lines is a potential problem. Shooting remains a minor threat.

3.3.6.5 Golden Eagle

Life History: This species uses rugged and remote mountain ranges for nesting; foraging over open desert in a range approaching 100 square miles.

Population Status in the Planning Area: Golden eagle is widespread in mountainous areas of the planning area. The Argus Mountains, El Paso Mountains, Newberry Mountains, Red Mountain and the southern Sierra Nevada Mountains contain several golden eagle nest sites. Within the China Lake NAWS Mojave B Range, the Eagle Crags provide outstanding habitat for golden eagle. The Great Falls Basin area contains several nest sites.

Where development has encroached on historical nesting sites, golden eagles sometimes make new nests on electrical transmission lines, as in Adelanto.

Regulatory Status: California: Fully Protected, Species of Special Concern

Threats Affecting the Golden Eagle: The three main threats to the Golden Eagle are: 1) shooting; 2) electrocution from electrical distribution and transmission lines; and 3) lead poisoning from eating carrion with bullet fragments. Disturbance from vehicles or human activities at nest sites is a minor threat. Golden Eagle numbers are limited within the planning area by the availability of nest sites. Protection of known nest sites is therefore the most effective method of preserving Golden Eagles in the planning area.

3.3.6.6 Gray Vireo

Life History: This species is found on arid slopes dominated by short, densely branched, stiff-twigged shrubs. It is migratory, occurring in the western Mojave Desert from early April until mid-August.

Population Status in the Planning Area: Gray vireos breed in small numbers at a few sites on the southwest margin of the West Mojave planning area. In Los Angeles County one singing bird was present in summer 1997 just west of the junction of Pallett Creek and Big Rock Creek (elevation = 3800 ft.) near Valyermo. This is approximately 8 mi. (5 km) west of Bob's Gap (elevation = 4200 ft.), which was occupied by 1-3 pairs from 1981 to 1992. In 1985 an additional territorial bird was found along Largo Vista Road, southeast of Pearblossom; this is approximately 8 mi. (5 km) east of Bob's Gap.

In San Bernardino County, gray vireos have bred consistently in the Round Valley/Rose Mine area of the eastern San Bernardino Mountains (elevation = 6890-7870 ft.), and likely breed locally in similar habitat elsewhere in those mountains. Territorial males were located in the upper Crystal Creek drainage, west of Cushenbury Canyon, in 1988; this is only 1-2 mi. (1.5-3 km) south of the West Mojave Plan boundary. They formerly bred in chamise-dominated chaparral in Cajon Pass. Egg sets were taken south of Hesperia, at the southern edge of the West Mojave Plan area, in 1937 and 1949. There were recorded breeding gray vireos at Black Rock Spring, Quail Spring, and Smithwater Canyon, all in the northern portion of Joshua Tree National Park.

In Kern County gray vireos have bred on the west side of Walker Pass. There is a single sight record of uncertain authenticity at Castle Butte, east of California City in 1977.

Regulatory Status: BLM Sensitive, California Species of Special Concern.

Threats Affecting the Gray Vireo: The reasons for the apparent decline of this species in southern California are unclear. Cowbird parasitism is a likely threat.

3.3.6.7 Inyo California Towhee

Life History: The Inyo California towhee is a narrow endemic whose range is almost entirely within the planning area. The USFWS has prepared a Recovery Plan and critical habitat has been designated. In 1998, an extensive survey of the entire range of this bird was conducted.

The bird nests near riparian vegetation, including very small springs and seeps, and forages in mixed Mojave desert scrub. It ranges from 2680 feet to 5630 feet in elevation. All towhee sightings have been within 700 yards of a water source.

Population Status in the Planning Area: This bird is restricted to the southern half of the Argus Range in Inyo County. The extent of occupied habitat has been estimated at 24,176 acres. This figure does not include mountainous areas between nesting territories that may be used for dispersal or in the non-nesting season.

Two thirds of the range of the Inyo California towhee falls within the boundaries of the China Lake NAWS. Current management is compatible with conservation of this bird, and the Resources Management Plan for the base will address conservation of this species. The remaining one third of the range is managed by BLM and the CDFG. These agencies have established the Great Falls Basin ACEC, the Argus Mountains Wilderness, and the Indian Joe Canyon Ecological Reserve.

LaBerteaux and Garlinger (1998) conducted an Inyo California towhee survey during the 1998 breeding season. A total of 640 adult towhees representing an estimated 317 pairs and 23 single adults were detected at 210 sites within the Argus Range. Prior to the 1998 survey, the towhee population was estimated to be no more than 200 individuals. Along with an increase in the numbers of birds detected, the 1998 census documented a range expansion 15 km to the north. Seventy-three percent of the population occurred on U. S. Navy lands, 25% on BLM lands on the east slopes of the Argus Range, and 2% on State-owned and private lands.

Inyo California towhees (*Pipilo crissalis eremophilus*) were again surveyed by LaBerteaux during the 2004 breeding season on BLM and State lands in the Argus Range. Two hundred four adult towhees representing an estimated 99 breeding pairs and 11 unmated adults were detected at 93 sites. Not all sites occupied in 1998 were occupied in 2004. At sites surveyed in both 1998 and 2004, the adult population increased by 13.6%. Since approximately 27.6% of the population occurs on BLM and State lands, the population size throughout the range of the Inyo California Towhee was estimated at 725 adults.

The towhee recovery plan established, as a criterion for delisting, the maintenance of a population of at least 400 birds for a period of five years. The 1998 and 2004 surveys indicate that the populations are near or at the revocery goal levels.

Regulatory Status: Federal Threatened, California Endangered.

Threats Affecting the Inyo California Towhee: Destruction and degradation of habitat by feral burros and horses is a primary threat. Other potential threats include cattle grazing, off-highway vehicle activities, mining, and encroachment by rural residents. Water exportation from occupied springs (Bainter Spring, Alpha Spring, Benko Spring, North Ruth Spring #3) is a current threat or potential threat. Trespass camping and hunting near the springs may impact the birds and their habitat. Invasive exotic plants are present at some of the water sources; these exotics can reduce the quality of the nesting habitat.

3.3.6.8 LeConte's Thrasher

Life History: The habitat for this species is creosote bush scrub with stands of cholla cactus, Joshua trees, and thorny shrubs.

Population Status in the Planning Area: LeConte's thrasher is widespread throughout the planning area, favoring areas of cacti, Joshua trees, and desert washes. It is absent from playas and mountainous areas.

Regulatory Status: California Species of Special Concern.

Threats Affecting the LeConte's Thrasher: The primary threat is loss of habitat and fragmentation of habitat into segments too small to support a viable population in the long term. LeConte's thrashers are sensitive to vehicle traffic during the nesting season, especially off road travel in washes.

3.3.6.9 Long-Eared Owl

Life History: Riparian groves of willows and cottonwoods, stands of oaks in desert mountains, and dense stands of junipers are the preferred nesting habitat in the California desert. The long-eared owl disperses widely and can migrate long distances, and appears to exhibit low nest site fidelity. Therefore, protection of the woodland habitat is more important than protection of individual nest sites. This species often nests communally in the winter, preferring dense stands of trees, even plantings near human habitation.

Population Status in the Planning Area: Long-eared owl has been found in several locations in the Argus Mountains, and is known to nest at the largest riparian sites in the western Mojave Desert, including Big Morongo Reserve and Mojave Narrows Regional Park. Other recorded sites, presumably for nesting birds, are Leona Valley near Elizabeth Lake, and several sites near Lancaster. It is not clear whether the majority of birds are winter visitiors. Most records appear to be breeding. Communal winter roosts have been detected at Harper Dry Lake.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Long-Eared Owl: Flood control projects can impact or convert riparian habitat. Habitat degradation and disturbance at nest and roost areas are potential threats. This includes degradation of adjacent open foraging habitat. The increase of great horned owls and their predation of long-eared owls may be having an impact. Shooting remains a minor threat.

3.3.6.10 Prairie Falcon

Life History: The prairie falcon is found throughout the western Mojave Desert, although it generally avoids urbanized areas. Nests are located on cliffs in rugged mountain ranges, often within ½ mile of a water source. Mountain ranges near agricultural areas also are favored because of increased prey density near nest sites. In winter, birds disperse widely, and are joined by migratory birds from northern latitudes.

Population Status in the Planning Area: Prairie falcons are widespread in mountainous areas of the planning area. Three sites are recognized as high-density nesting locations: Red Mountain/El Paso Mountains, Robber's Roost, and Newberry Mountains/Granite Mountains. In addition, a substantial population has been reported from the Mojave B Range of the Naval Air Weapons Station.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Prairie Falcon: Human disturbance at certain prairie falcon nest sites is a threat. Urbanization surrounding an historical eyrie gradually degrades the foraging habitat and increases disturbance at the nest site so that they are abandoned. New mining projects occasionally threaten selected nest sites. Eggshell thinning due to ingestion of pesticides may be a problem.

3.3.6.11 Southwestern Willow Flycatcher

Life History: The southwestern willow flycatcher breeds only in riparian woodland, typically adjacent to or even over water. Surface water or saturated soil is usually present in or adjacent to nesting sites during at least the initial portion of the nesting period.

Population Status in the Planning Area: Summering willow flycatchers appear to be known from only two sites in the western Mojave Desert:

(1) At Big Morongo Canyon Preserve, one nesting pair in 1981. Subsequent years' regular study, however, failed to reveal any further resident willow flycatchers. The birds' use of the site is evidently only ephemeral.

(2) Along the Mojave River. Since the specimen from Oro Grande in 1920, two observations: one at Mojave Narrows Regional Park in 1990 and the second about one-quarter mile downstream (north-northwest) of the Interstate 15 crossing in 1994 and 1995.

Regulatory Status: Federal Endangered, California Endangered.

Threats Affecting the Southwestern Willow Flycatcher: Habitat loss and degradation and brood-parasitism by the brown-headed cowbird are the biggest threats.

3.3.6.12 Summer Tanager

Life History: Western populations of the summer tanager require riparian woodland or forest dominated by cottonwoods and willows, usually in a climax stage. Little quantitative data exist regarding the composition of summer tanager habitat in the California deserts. Five vegetation plots conducted within tanager territories at Mojave Narrows Regional Park in 1991 revealed a canopy cover of 60-85%. The same plots had shrub cover from 1-23%, and herbaceous cover from 25-90%.

Population Status in the Planning Area: Summer tanagers have nested at the following localities within the western Mojave: Big Rock Creek near Valyermo (1-2 pairs annually, Little Rock Creek (1-2 pairs in the West Mojave, and 1-2 pairs on the adjacent Angeles National Forest), Mojave River at Victorville (10-15 pairs annually), Cushenbury Springs (1 pair, at least sporadically), Morongo Valley (2-4 pairs annually), and Yucca Valley (1 pair annually). A female or immature was observed at Camp Cady in August 1997, suggesting potential breeding.

Numbers along the Mojave River at Victorville have increased notably over the past 11 years: from 3 or 4 pairs in 1987 to 12-15 pairs in 1996, and at least 12 pairs in 1997. In 2000, 15 birds were counted in the Mojave River between Victorville and Helendale in an area not previously surveyed. The population at Big Rock Creek has remained stable since the early 1980s at 1-2 pairs annually. Breeding at the golf course at Yucca Valley has been sporadic. Regular fieldwork has not been conducted at Cushenbury Springs, so the summer tanager's continuity there is not known.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Summer Tanager: Habitat destruction is the primary threat to summer tanagers in California. Habitat destruction can occur in several ways, with the most catastrophic losses resulting from clearing of large tracts of forest or woodland for agriculture, development, or flood control. On a smaller scale, activities such as woodcutting can degrade or destroy suitable breeding habitat for this species. Groundwater pumping can gradually make the riparian habitats unsuitable.

3.3.6.13 Vermilion Flycatcher

Life History: This species occupies habitat with open riparian areas with accessible water and dominated by mesquite with willow and Fremont cottonwood. It uses parkland or golf course settings that support either native or non-native trees, and may or may not have accessible water. In native habitats, trees used for nesting range from massive cottonwoods, sycamores, and even oaks to smaller trees such as willow and mesquite.

Population Status in the Planning Area: The Vermilion Flycatcher breeds in many locations in the Mojave Desert, almost all of which are well above 500 ft. elevation. For example, this species breeds regularly (up to 3 pairs) in Morongo Valley (San Bernardino County), at both Covington Park and the northern edge of the Big Morongo Canyon Preserve. Additional areas within the West Mojave where the Vermilion Flycatcher has recently nested are Yucca Valley, San Bernardino County (up to 3 pairs from 1991 through 1999); Jess Ranch in Apple Valley, San Bernardino County (1 pair in 1995 and 1997); Fort Irwin, San Bernardino County (1 pair in 1996); Ridgecrest, Kern County (1 pair in 1992 and 1994); China Lake, Kern County (1 pair in 1994); Antelope Valley northwest of Lancaster, Los Angeles County (1 pair in 1998); and Leona Valley, Los Angeles County (1 pair in 1994). In 2000, six birds (2 pairs and 2 adult males) were found along a 1mile stretch of the Mojave River bounded by alfalfa fields south of Helendale.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Vermillion Flycatcher: The primary threat to the Vermilion Flycatcher is habitat loss and nest parasitism by the Brown-headed Cowbird.

3.3.6.14 Western Snowy Plover

Life History. The Western snowy plover nests in the West Mojave on certain playas and wetland areas. Most appear to depart for the winter, but migrants and wintering birds are known from a few localities. They favor playas, seasonal wetlands, and sewage treatment ponds or ponds managed for wintering waterfowl.

Population Status in the Planning Area: Western snowy plover appears to nest with regularity on Edwards AFB at Piute Ponds. Other reported nest locations are Harper Dry Lake, Koehn Lake, China Lake, Rosamond Lake, Dale Lake, and the evaporation ponds at the Edison facility in Daggett, although the birds may not use these sites every year. A survey of nesting sites for this species at Searles Lake in 2001 recorded 14 broods of chicks and 2 nests were found (LaBerteaux, 2001). No plovers were detected at Koehn Lake in spring 2001 (Cunningham, 2001). No plovers or habitat were detected at Superior Dry Lakeor at East and West Cronese Lakes (Wehjte, 2001). Six plovers (five males, one female) were seen at Harper Dry Lake on May 30, 2001, but none were seen on July 6. One pair was judged to be breeding at Harper Dry Lake. At least two pairs were reported to nest at Harper Dry Lake in 2003 and 2004. The bird may use all of these sites in winter.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Western Snowy Plover: Nests are vulnerable to human disturbance, including vehicle traffic and pets. Insufficient water supply to permanent and seasonal wetlands is a problem in many areas, including Harper Dry Lake. Rising water levels that inundate nests is a problem at managed ponds and during exceptional wet years at natural playas. They are very susceptible to predators, including ravens, coyotes, foxes and feral dogs and cats.

3.3.6.15 Western Yellow-billed Cuckoo

Life History: Yellow-billed cuckoos have one of the most restrictive suites of macro-habitat requirements of any bird species. Not only are they restricted to a single habitat type, the size and configuration of the habitat is also extremely important. During the breeding season in California, they are confined to cottonwood-willow riparian forest containing a tall canopy.

Population Status in the Planning Area: While there are no records of nesting areas within the planning area, birds have been seen during the breeding season along the Mojave River between Victorville and Barstow. Desert oases, with willows and cottonwoods, could provide habitat for migrating yellow-billed cuckoos. One migratory bird was observed in 2001 at upper Sand Canyon in Kern County.

Regulatory Status: Federal Candidate, California Endangered.

Threats Affecting the Western Yellow-billed Cuckoo: The primary threat to this bird is riparian habitat loss.

3.3.6.16 Yellow-breasted chat

Life History: All breeding in the western Mojave Desert occurs in riparian habitats dominated by cottonwoods and willows. Nesting habitat must have dense understory vegetation and larger trees that are used for singing perches.

Population Status in the Planning Area: Yellow-breasted chats have nested at five localities: the Mojave River at Victorville (6-10 pairs annually), Camp Cady (2 pairs in 1985), Morongo Valley (2-7 pairs annually), Cushenbury Springs (1 pair, sporadically), and Afton Canyon (1 pair in 1977).

Yellow-breasted chats are uncommon to rare migrants throughout the West Mojave. They have not been reported during winter.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Yellow-breasted Chat: Habitat destruction and parasitism by brown-headed cowbirds are the primary threats to breeding yellow-breasted chats in the western Mojave Desert. Habitat destruction and degradation occurs in many ways, with the most catastrophic losses resulting from clearing of large tracts of forest or woodland for agriculture, development, or flood control. Groundwater pumping can also lead to loss of suitable nesting habitat.

3.3.6.17 Yellow Warbler

Life History: In the California desert, yellow warblers occur in riparian woodland or forest dominated by cottonwoods and willows. This species nests in habitats with dense understory vegetation that contain cottonwoods and willows. Fremont cottonwoods and larger

willows typically form the canopy at breeding sites such as Big Morongo Canyon and the Mojave River at Victorville.

Population Status in the Planning Area: The yellow warbler has nested at only four localities: the Mojave River at Victorville (8-12 pairs annually), Camp Cady (1 pair in 1985), Morongo Valley (1-6 pairs annually), and Big Rock Creek (1-2 pairs annually). Yellow warblers were present and potentially breeding at several of the east Sierra Canyons in 2001.

As a migrant, yellow warbler is common throughout the western Mojave Desert. Hundreds have been observed in mid-May at Butterbredt Spring; fall daily maxima in the same area are typically between 50-100. It is casual during winter. Recent records exist for Arrastre and Grapevine Canyons south of Apple Valley and in the east Sierra Canyons of Kern and Inyo counties.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Yellow Warbler: Habitat destruction and parasitism by brown-headed cowbirds are the primary threats to breeding yellow warblers in the western Mojave Desert. Groundwater pumping in the Mojave River is a potential threat.

3.3.7 Reptiles

3.3.7.1 Mojave Fringe-Toed Lizard

Life History: The Mojave fringe-toed lizard in endemic to southern California and a small area of western Arizona. This species is an obligate sand-dweller, found in dunes, sand fields, sand hummocks, and other sand deposits throughout the Mojave Desert in California. Its elevation ranges from 300 to 3000 feet. Its survival requires conservation of the blowsand ecosystem processes, including the sand source, fluvial sand transport areas, aeolian sand transport areas, wind corridors, and the occupied habitat.

Population Status in the Planning Area: Mojave fringe-toed lizards occur at several disjunct localities in the planning area. Occupied habitat is found at the Saddleback Buttes region of Los Angeles County, Edwards Air Force Base, El Mirage, Mojave River near Barstow, Mojave Valley, Alvord Mountain, Pisgah, Cronese Lakes, Dale Lake, Twentynine Palms, and Harper Dry Lake.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Mojave Fringe-toed Lizard: Urban and rural development has fragmented populations along the Mojave River and at Twentynine Palms. Agricultural development has eliminated and fragmented populations in the Mojave Valley. These threats will continue during the duration of the permit.

Other major threats are flood control structures which prevent the waterborne flow of sand towards the occupied habitat, windbreaks that impede the aeolian transport of sand to the occupied habitat and vehicle use within the occupied habitat.

3.3.7.2 San Diego Horned Lizard

Life History: The San Diego horned lizard is endemic to southern California and northern Baja California, Mexico. This lizard prefers areas with loose, fine soils, an abundance of open areas for basking, and plenty of native ants and other insects. Within the planning area, the San Diego horned lizard is restricted to juniper woodland, Mojave mixed woody scrub and chaparral habitats above 3,000 feet elevation.

Population Status in the Planning Area: The San Diego Horned Lizard is found in the Antelope Valley California Poppy State Reserve, east along the base of the San Gabriel and San Bernardino Mountains to Joshua Tree National Park. This lizard is believed to be extirpated from the Mojave River near Oro Grande and from many areas near Palmdale.

Regulatory Status: California Species of Special Concern.

Threats Affecting the San Diego Horned Lizard: Urban and rural development on the north slope of the San Gabriel Mountains is the primary threat to the long-term viability of the desert populations. Increased predation by cats and dogs are a threat. Collection by collectors and children has contributed to the decline in numbers of this species, and this threat may continue today. Off-road vehicles pose a potential threat, particularly at the Mojave Forks dam. The introduction of Argentine ants and their elimination of the native ant food base may be contributing to the decline.

3.3.7.3 Southwestern Pond Turtle

Life History: Pond turtles are found within and adjacent to perennial water, especially at locations containing ponds. The turtles utilize adjacent uplands as well as the wetland habitats. Nest sites may be located several hundred feet from the water's edge.

Population Status in the Planning Area: The Southwestern pond turtle is found within the Mojave River in areas of permanent water, such as Mojave Narrows, Camp Cady, and Afton Canyon. It is known historically from Deep Creek at the southern edge of the planning area in the San Bernardino Mountains. A relatively large population is found west of Palmdale at Lake Elizabeth. It also occurs along Amargosa Creek and may occur along its tributaries.

Potential habitat is found on public and private land in the Kelso Valley at the northwest boundary of the planning area. Additional potential habitat is located within the Jawbone Butterbredt ACEC and at Barrel Springs near Palmdale.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Southwestern Pond Turtle: The greatest single threat to this species is habitat destruction. Urban and rural development on the north slope of the San Gabriel Mountains is the primary threat to the long-term viability of the Elizabeth Lake and Amargosa Creek populations. Urban and agricultural demands on the water sources are a threat for the Mojave River pond turtle locations. Collection by collectors and children has contributed to the decline in numbers of this species. Bullfrog predation may impact populations.

3.3.7.4 Panamint Alligator Lizard

Life History: The Panamint alligator lizard is found most often in canyons with riparian habitat and nearby permanent springs. They forage in thick brush and along talus slopes where they may be observed basking on rocks in open areas, near thick vegetation.

Population Status in the Planning Area: The Panamint alligator lizard is endemic to California, where it is known only from 16 disjunct localities in the Panamint Mountains (Brewery and Limekiln Springs, Surprise Canyon, Pleasant Canyon), Nelson Mountains (Grapevine Canyon), Inyo Mountains (Daisy Canyon, Lime Hill), and White Mountains (Batchelder Spring, Marble Canyon, Tollhouse Spring, Westgard Pass) of Inyo County, California. Sight records (12) have been reported for the eastern Argus, Cosos, Panamint, Inyo, and White Mountains of Inyo and southeastern Mono counties, California.

Surveys conducted in 2002 at the China Lake NAWS have located the Panamint alligator lizard in the Argus Mountains at Mountain Springs Canyon. There are no verified records from the planning area outside of the China Lake NAWS.

Regulatory Status: BLM Sensitive, California Species of Special Concern.

Threats Affecting the Panamint Alligator Lizard: A potential decline in Panamint alligator lizard populations may be attributed to the direct loss of riparian habitat. Although there are no baseline data that suggests a current decline in population numbers, habitat loss or alteration due to expanded mining operations, off-highway vehicle (OHV) activity, grazing (domestic and feral), and introduction of non-native invasive plant species (e.g., Tamarisk) could have serious adverse effects in riparian areas where this species occurs.

3.3.8 Plants

3.3.8.1 Alkali Mariposa Lily

Life History: This species is most often found at the edges of alkali sinks and playas, in floodplains with alkali soils, and at alkali seeps and springs. The alkaline floodplain north of Lancaster and south and east of Edwards AFB appears to provide a large block of undisturbed habitat for alkali mariposa lily. Sheet flooding of the flat terrain supports the plants, which are abundant in wet years. The saltbush scrub north of Highway 138 and west of EAFB has not been well surveyed.

Population Status in the Planning Area: The western Mojave Desert comprises the majority of the range of alkali mariposa lily, although the Kern River Valley east of Lake Isabella supports substantial populations. Within the Planning area are some very significant populations as well as smaller, scattered populations. Large numbers of alkali mariposa lilies are known from Edwards AFB (>100,000 plants), Los Angeles County just south of the southwest corner of Edwards AFB (10,000 plants), and Paradise Spring near Fort Irwin (2-3,000 plants). The Kelso Valley contains alkaline meadows supporting >2,000 plants in 1988. This area is a southern extension of the Lake Isabella group of occurrences.

Smaller populations of this species are known from Red Rock Canyon State Park and Cushenbury Springs. Collections have been recorded from several playas and alkaline springs between EAFB and Fort Irwin, and one outlying population was recorded from Twentynine Palms in 1902. Many playas within the planning area have not been surveyed for this species.

Regulatory Status: California Species of Special Concern.

Threats Affecting the Alkali Mariposa Lily: Many occurrences are threatened with urbanization, especially the very large populations in the Amargosa Creek floodplain near Lancaster. Reduction of water supply to playas and alkaline floodplains could pose a threat. Maintenance of sheet flooding in the Rosamond Lake basin is essential, and the west part of this basin is becoming fragmented by agriculture and urban development. Lowering of groundwater to alkaline springs and seeps is a potential threat. The next greatest threat is urbanization in the Lancaster area where the largest populations are concentrated.

Grazing is a potential threat to the plants on private ranch lands in the Kelso Valley.

3.3.8.2 Barstow Woolly Sunflower

Life History: This species is a western Mojave Desert endemic. It is found on bare areas with little soil, often containing a shallow subsurface caliche layer.

Population Status in the Planning Area: Most known locations are between Kramer Junction and Harper Dry Lake. The range of Barstow woolly sunflower, however, extends west of Kramer Junction and includes Edwards Air Force Base. It is also located east of Harper Dry Lake on the Coolgardie Mesa. The BLM has established a 320-acre ACEC for protection of this species east of Kramer Junction. CDFG mitigation lands northeast of Kramer Junction are believed to support this species.

Regulatory Status: BLM Sensitive.

Threats Affecting the Barstow Woolly Sunflower: Populations are subject to removal within the utility corridor between Kramer Junction and Harper Dry Lake. Military operations at Edwards AFB could be a threat in the future. Current management at EAFB is compatible with protection of this species. Off-road vehicle travel is a threat.

3.3.8.3 Carbonate Endemics (Cushenbury Buckwheat, Cushenbury Milkvetch,Cushenbury Oxytheca and Parish's Daisy)

Life History: These species are restricted to limestone and dolomite substrates in the San Bernardino Mountains at the southern edge of western Mojave Desert. The majority of the range of these species is on the adjoining San Bernardino National Forest. An extensive database of localities and underlying land uses has been assembled in cooperation with the University of Redlands.

These species are substrate dependent; carbonate outcrops and soils on the north slope of the San Bernardino Mountains and conservation of habitat generally protects all species in the plant community. Parish's daisy and Cushenbury milk vetch are found at lower elevations than Cushenbury oxytheca and Cushenbury buckwheat.

Population Status in the Planning Area: Restricted to the north slope of the San Bernardino Mountains on carbonate substrates. The majority of the populations are on Forest Service lands at higher elevations. The distribution of Parish's daisy extends east to the Town of Yucca Valley.

Regulatory Status: Federal Endangered – Cushenbury buckwheat, Cushenbury milkvetch, Cushenbury oxytheca, Federal Threatened – Parish's daisy.

Threats Affecting the Carbonate Endemics: The primary threat is mining, which has fragmented some existing populations and eliminated others. Existing regulatory mechanisms under the mining law are inadequate to prevent fragmentation of populations. The extent of mining claims covering the carbonate substrates limits the opportunities for conservation. Vehicle travel on occupied habitat is a minor potential threat and travel off roads could adversely modify designated critical habitat.

3.3.8.4 Charlotte's Phacelia

Life History: Parish's phacelia is a striking blue and white annual wildflower, about seven inches tall, blooming from April to June. The flower falls off before the fruits develop. It is generally associated with naturally disturbed or unstable habitats such as loose sand, talus, and washes, and is most often found on open, arid slopes ranging in elevation from 2,500 to 7,200 feet. Population numbers fluctuate considerably from year to year, probably depending on rainfall.

Population Status in the Planning Area: This species occurs in the high Sierra Nevada, its desert-facing foothills, and the adjacent El Paso Mountains, mostly from the foothills above Fremont Valley, north through Red Rock Canyon State Park, to east-facing canyons above Indian Wells Valley. The range is almost entirely within the planning area. Most documented populations are near roads or trails in the lower canyons and washes, or are in high-interest natural areas (e.g., Red Rock Canyon State Park). Several locations are associated with the Los Angeles Aqueduct and its various access roads. In view of the documented locations at the Sierra Nevada crest and on its lower slopes, it is likely that additional undocumented populations occur

on the inaccessible mountain slopes above the foothills, washes, and lower canyons. Additional populations also are likely to occur within the China Lake Naval Air Weapons Center.

Regulatory Status: BLM Sensitive.

Threats Affecting the Charlotte's Phacelia: Most of the known populations are within grazing allotments. Grazing is mentioned repeatedly in CNDDB records, but there appears to be no documentation of population declines in response to grazing. Other potential threats are off-road vehicles and wildflower collecting.

3.3.8.5 Crucifixion Thorn

Life History: Crucifixion thorn is long-lived, thorny leafless shrub or small tree of washes and other sites where water accumulates. It is particularly characteristic of non-saline dry lakes. It is mostly restricted to outwash plains and reported not to occur on rocky slopes. Plants occur as scattered colonies of fairly small size that never extend far across the landscape. Fruits remain on the plant for long periods, up to several years, and may be distributed by vertebrate herbivores. The plants are dioecious, that is, male and female flowers occur on separate plants.

Population Status in the Planning Area: This species is disjunct from its primary range and is found in the sand fields and washes north and east of Pisgah Crater and southeast of Fort Irwin, where it forms a distinct community, termed crucifixion thorn woodland. Two populations are known in the western Mojave Desert, from the Pisgah area and 5 miles southeast of Fort Irwin. Three of the ten occurrences are on private land. Another site is located near Amboy, just outside the planning area. A single plant was located near Newberry Springs during the 1999 tortoise surveys.

Regulatory Status: No special status.

Threats Affecting the Crucifixion Thorn: No significant human threats are known to exist. Some populations are, or were, somewhat impacted by OHV recreation, but the mature plants are large and stout enough that they are generally avoided. Seedlings could be damaged or destroyed by OHV activity.

3.3.8.6 Desert Cymopterus

Life History: Desert cymopterus is a long-lived herbaceous perennial, which has conspicuous purple flowers during early spring, but dies back completely aboveground in the summer, fall and early winter. It survives drought by storage of food in its large taproot, and is termed a geophyte. Flowering and seed production appear to be episodic, with large numbers of viable seed produced in wet years and little or no flowering and seed production in dry years. Desert cymopterus is generally found on sandy soil.

Population Status in the Planning Area: This species is a western Mojave Desert endemic, found from California City east to the Superior Valley and from the Cuddeback Lake area south to near Kramer Junction. Early collections of this plant from Lucerne Valley, Victorville and Apple Valley are from areas now developed, and the most recent records date from 1941.

Desert cymopterus is found in low densities and is widely dispersed. The vast majority of known recent occurrences >90%) are from Edwards AFB. Several studies of utility corridors have verified presence northeast of Kramer Junction on BLM and private lands, and additional locations were detected in 200 and 2001 near Hinkley and in the Superior Valley, the latter on lands transferred to the Army for the Fort Irwin expansion. Desert cymopterus remains one of the rarest and least known of the West Mojave target plant species.

The pattern of distribution of desert cymopterus suggests that it favors lands on the east side of desert playas where blowsand has accumulated.

Regulatory Status: BLM Sensitive

Threats Affecting the Desert Cymopterus: Threats to the desert cymopterus are not obvious. Urbanization in the Victor Valley and utility development east of Kramer Junction have eliminated some plants or reduced available habitat. Off-road vehicle travel has been cited as a threat, but documentation of loss of plants is missing. Cattle and sheep formerly grazed in occupied habitat, but livestock grazing is mostly restricted at known populations. Herbivory to the leaves by native insects, rodents, and perhaps tortoises is apparent, but the extent of damage to population size is not documented.

3.3.8.7 Kelso Creek Monkeyflower

Life History: Loamy, coarse sands on alluvial fans and deposits of granitic origin within the Joshua tree and juniper woodlands of the Kelso Valley in Kern County.

Population Status in the Planning Area: Seven of eight known occurrences are within a 12 square mile area in the Kelso Valley, with the remaining occurrence outside the Planning area nine miles to the northwest. Approximately 990 acres of public land and 1,000 acres of private land are occupied habitat. An additional 1,600 acres of potential habitat on public land has been identified.

Regulatory Status: Federal Candidate.

Threats Affecting the Kelso Creek Monkeyflower: Identified threats include trampling by cattle and off-highway vehicle activity. The main threat to this species is the present or threatened destruction, modification, or curtailment of its habitat or range. Mobile home and subdivision developments, including road access, threaten populations on private land. Fire-fighting operations have damaged one population in the past.

3.3.8.8 Kern Buckwheat

Life History: Kern buckwheat is found on ridge tops in poorly draining depressions in white bentonite clay soils thought to be from volcanic ash. These depressions have pebbles, gravel and rock cemented into the soil surface.

Population Status in the Planning Area: All of the known populations are within the planning area. There are two to four populations on public land and one or two on private land. All are located in the southern Sierra Nevada Mountains in Kern County either west of Middle Knob and south of Pine Tree Canyon, or on Sweet Ridge. There are four populations east of Sand Canyon described as follows:

- Population A - "Near" Zond Windfarms transmitting Station; a 2-5 acre site in a basin below the station.
- Population B - On Zond property; a 1 acre site, bisected by the road.
- Population C - On BLM managed land ca. 1/2 mile south of population B; a 2-3 acre site, bisected by the road.
- Population D - On BLM managed land about 3 miles south of population C; perhaps 4 to 5 acres.

Regulatory Status: BLM Sensitive

Threats Affecting the Kern Buckwheat: Maintenance of wind energy facilities poses a threat to this species. Other potential threats are off highway vehicle (OHV) use, future construction and grazing.

3.3.8.9 Lane Mountain Milkvetch

Life History: Lane Mountain milkvetch is an herbaceous perennial that grows up within a host plant, which it uses for support. Plants occur on granitic substrates with shallow soils.

Population Status in the Planning Area: The Lane Mountain milkvetch is a very local endemic species found primarily on public and military land. Its entire known range is within the western Mojave Desert between Goldstone and Barstow, San Bernardino County, in an area no more than 13 miles in diameter.

In 2001 and 2002 the Army conducted extensive surveys for Lane mountain milkvetch and found four primary population areas. These are found on public (BLM) lands, on Fort Irwin National Training Center, at the Goldstone Deep Space Communications Complex, and on private lands on the Coolgardie Mesa. The Fort Irwin population is fenced, and most training activities take place outside the fence.

Regulatory Status: Federal Endangered.

Threats Affecting the Lane Mountain Milkvetch: Few threats now exist for Lane Mountain milk vetch. Its low numbers make it susceptible to extinction from stochastic (unanticipated random) events. Expansion of training corridors at Fort Irwin could threaten this species. Increased activity within Fort Irwin or Goldstone Deep Space Communications Complex could threaten undiscovered populations of this species. Club mining activities on Coolgardie Mesa are a potential threat. Off-road travel within occupied habitat is a potential threat.

3.3.8.10 Little San Bernardino Mountains Gilia

Life History: This plant is found in dry canyons and along desert washes on alluvial fans. It requires sandy, well-aerated soil on flat ground with few or no competing species. Dense stands of weedy annuals are never present at occupied sites, which are all at the margins of streambeds.

Population Status in the Planning Area: The plant is restricted to the Little San Bernardino Mountains and the northeast portion of the San Bernardino Mountains. Of twelve major areas of occurrence, ten are within the western Mojave Desert. These are scattered into a number of discrete population segments, generally defined by drainage basins and washes.

Regulatory Status: BLM Sensitive.

Threats Affecting the Little San Bernardino Mountains Gilia: The greatest threat to the species is rural and suburban development near Yucca Valley and the community of Joshua Tree. A secondary threat is OHV recreation in washes. Future channelization or flood control projects could threaten the occupied drainages. Two of the ten West Mojave occurrences are within Joshua Tree National Park, one is on BLM lands, and seven are on private land.

3.3.8.11 Mojave Monkeyflower

Life History: Mojave monkeyflower is found in Joshua tree woodland and creosote bush scrub communities. It favors granitic soils, and is most often found on gravelly banks of desert washes. Occasionally it is found in sandy openings between creosote bushes and on rocky slopes above washes, areas that are not subject to regular water flows.

Population Status in the Planning Area: The Mojave monkeyflower is a restricted endemic whose entire range is within the western Mojave Desert. All occurrences are east of the Mojave River, and most are south of Barstow. Major populations are found between Victorville and Barstow west of Interstate 15, and in the Ord-Rodman-Newberry Mountains area. Populations in the Waterman Hills north of Barstow are not threatened.

Regulatory Status: BLM Sensitive.

Threats Affecting the Mojave Monkeyflower: Populations between the Mojave River and Interstate 15 are situated in a patchwork of private and public lands. Quarries and rural development on private land have fragmented some populations, a trend which may continue. Exchange of BLM lands for the Air Force Land Tenure Adjustment program could lead to loss of occurrences on public lands in the Brisbane Valley.

Populations south of Barstow and Dagget are threatened by off-road vehicle activity. Several populations are in or adjacent to the Stoddard Valley OHV open area. Some populations are bisected by Stoddard Valley Road and Camp Rock Road, and adjacent OHV trails have eliminated some plants.

Livestock grazing (Ord cattle allotment) occurs within this species' range and some damage to plants may arise from trampling. Mining does not appear to threaten Mojave monkeyflower at this time, though expansion of quarries near Oro Grande could result in the loss of occupied habitat.

Utility Corridor O traverses the western edge of the Brisbane Valley. Utility Corridor D, the Boulder Corridor, traverses the southeast edge of the Brisbane Valley unit and bisects the eastern part of the proposed Conservation Area near Daggett Ridge.

Because numbers of this annual species are dependent on winter rainfall, a potential threat is inbreeding, genetic bottlenecks, and lack of sufficient pollinators.

3.3.8.12 Mojave Tarplant

Life History: Mojave tarplant is found in Joshua tree woodland, creosote bush scrub, and mixed desert scrub communities at scattered locations throughout the planning area. Mojave tarplant is found near springs, seeps, wetland margins, swales and stream channels.

Population Status in the Planning Area: Within the planning area, the Mojave tarplant occurs in fairly large numbers at the base of the southern Sierra Nevada Mountains. An historical locality at Mojave Forks apparently no longer supports this species. Outside the planning area, this species occurs in the Peninsular Ranges of Riverside and San Diego counties.

Regulatory Status: BLM Sensitive, California Endangered.

Threats Affecting the Mojave Tarplant: Few threats are known to Mojave tarplant. At the historical Mojave Forks locality, extensive off-road vehicle activity has degraded the habitat.

3.3.8.13 Parish's Alkali Grass

Life History: Parish's alkali grass is found in alkali seeps and springs.

Population Status in the Planning Area: Parish's alkali grass is known from a single location, Rabbit Springs near Lucerne Valley, on private land within the planning area. This location is considered to be an important and interesting disjunct occurrence, and is in an area of

considerable importance to the botanical history of the western Mojave Desert.

Regulatory Status. No special status.

Threats Affecting the Parish's Alkali Grass: Anything that lowers the water table at the springs will likely result in the destruction of the only known California population of this species, as this plant is absolutely dependent upon continued surface flows for its existence. Grazing, and potential road maintenance or widening threatens the small population.

3.3.8.14 Parish's Phacelia

Life History: Parish's phacelia is found on alkaline flats, that is, playas and dry lakebeds. It is most common on the silty and clayey soils of the lowest portion of the dry lakebeds south of Fort Irwin.

Population Status in the Planning Area: This species has a large population in California, disjunct from its primary range in Nevada. It occurs on the series of unnamed dry lakes (playas) south of Fort Irwin between the Manix tank trail and Coyote Dry Lake.

Regulatory Status: No special status.

Threats Affecting the Parish's Phacelia: No threats have been identified, but vehicle activity, including military vehicles, could be a major impact to the population. Surface disturbance on the private lands could eliminate the plants in those locations. The likelihood of development of these lands is very low. Because there are only one or two known occurrences in California, it may be at risk of stochastic or catastrophic extinction.

3.3.8.15 Parish's Popcorn Flower

Life History: Parish's popcorn flower is a distinctive member of a large genus of annual wildflowers, many of which are found in wetlands. This species is a wetland obligate.

Population Status in the Planning Area: A single site at Rabbit Springs in Lucerne Valley supports this species, which emerges and flowers every year because of the reliability of the groundwater at this alkali seep. The only other recent records of this plant in California are from freshwater springs at the edge of Owens Lake in Inyo County.

Regulatory Status: BLM Sensitive.

Threats Affecting the Parish's Popcorn Flower: No current threats. Groundwater pumping has been reported as a potential threat. Because the single location is so small, even minor disturbances to the seep habitat could significantly affect the population.

3.3.8.16 Red Rock Poppy

Life History: This species occurs at elevations between 2300 and 3280 ft. It appears to be found in a rather common rock type of rhyolite tuffs, granitics and similar rocks.

Population Status in the Planning Area: All known occurrences of Red Rock poppy, including a probable occurrence on Edwards Air Force Base, are within the western Mojave Desert. A possible location in the Black Mountains is outside the eastern boundary of the planning area.

The taxon is definitely known from only four locations: Red Rock Canyon State Park (many locations); Mesquite Canyon, 0.4-0.6 miles north of Randsburg Road; 2 miles southeast of Searles Station (which may be in San Bernardino County, and is in the Summit Range); and on an "unnamed road" 1.2 miles north of Red Rock-Randsburg Road at a junction 3.3 miles east of the junction of California highway 14 and the Red Rock-Randsburg Road.

Regulatory Status: BLM Sensitive.

Threats Affecting the Red Rock Poppy: The CNPS inventory (Skinner and Pavlik, 1994) states that vehicles threaten the Red Rock poppy, but the extent of this threat is unknown. There may be other threats in various areas, but so little is known about this plant that it is impossible at this time to outline the nature of any additional threats.

3.3.8.17 Red Rock Tarplant

Life History: The Red Rock tarplant is found in seeps, springs and seasonally moist alluvium in an extremely hot and arid part of the Mojave Desert in the rain shadow of the southern Sierra Nevada Mountains. Specifically, it is found in: 1) sandy to gravelly washes, 2) moist alkaline margins of seeps and springs, 3) sandy alluvium at the foot of ridges and cliffs, and 4) ledges of dry colluvium supported by ribs of bedrock on cliffs.

Population Status in the Planning Area: The Red Rock tarplant is a very local endemic of the western El Paso Mountains. Once thought to only occur in Red Rock Canyon, it is now known to occur in adjacent Last Chance Canyon as well. Within Red Rock Canyon it occurs along the bottom of the canyon for about 4-5 miles.

Regulatory Status: California Rare.

Threats Affecting the Red Rock Tarplant: Repeated disturbance is the biggest threat to this species. OHV activity posed the greatest threat in the past, but it is now restricted within Red Rock Canyon State Park.

3.3.8.18 Salt Springs Checkerbloom

Life History: This plant is an herbaceous perennial, blooming from April to June, then dying back to ground level in the late summer, fall and winter. Specimens have been collected in

a variety of habitats, including chaparral, coastal sage scrub and yellow pine forest. In the desert, it appears to be restricted to alkali seeps and springs.

Population Status in the Planning Area: Although formerly widespread outside the desert, virtually no records are available since 1966. A single site at Rabbit Springs in Lucerne Valley supports this species, which emerges and flowers every year because of the reliability of the groundwater at this alkali seep.

Regulatory Status. No special status.

Threats Affecting the Salt Springs Checkerbloom: Urbanization has eliminated most historical locations.

3.3.8.19 Shockley's Rock Cress

Life History: Shockley's rock cress is a perennial herb found on limestone and quartzite outcrops and gravelly substrates at 3,000 - 6,000 feet elevation.

Population Status in the Planning Area: This plant is found primarily in the San Bernardino National Forest on the north slope of the San Bernardino Mountains, although it ranges to Inyo County, Nevada, and Utah. Nine occurrences have been reported by the NDDB within the planning area, 3 on public lands and 6 on private lands. The latter have been surveyed more intensively. In 1998, this plant was found within 51 plots randomly placed across the proposed carbonate plants conservation area, mainly within the San Bernardino National Forest. One isolated historical record is from Highway 247 north of its junction with Highway 18.

Regulatory Status: No special status.

Threats Affecting the Shockley's Rock Cress: Populations have been reduced by large-scale mining operations and this threat continues. The majority of public lands where this plant occurs have mining claims. Off road travel within occupied habitat is a minor potential threat.

3.3.8.20 Short-joint Beavertail Cactus

Life History: Short-joint beavertail cactus is mostly associated with Joshua tree, pinyon pine, and juniper woodlands, although it also occurs in chaparral and Mojave desert scrub communities. It has been reported from a wide variety of well-drained soils, from sandy to rocky, in open streambeds and on rocky slopes.

Population Status in the Planning Area: Short-joint beavertail cactus is found along the north slopes of the San Gabriel Mountains from the Anaverde Valley west of Palmdale east to the Cajon Pass. It occurs between elevations of 3000 – 6500 feet, and is found within the Angeles National Forest south of the West Mojave boundary. At the eastern edge of its range, between Cajon Pass and the Mojave River Forks Dam in the San Bernardino Mountains, the populations show intergradation with *Opuntia basilaris* var. *basilaris*.

Regulatory Status: BLM Sensitive.

Threats Affecting the Short-joint Beavertail Cactus: Nearly all of the occurrences of short-joint beavertail in the western Mojave Desert are on private land, and the primary threat is rural development in the Pinon Hills, Oak Hills, and Phelan areas in San Bernardino County, and suburban development in and near Palmdale. Large-scale developments at Las Flores Ranch and Summit Valley may threaten this species or the intergrade populations.

Off-road vehicle activity in the hills south and east of Phelan has damaged some habitat, and may eliminate plants.

3.3.8.21 Triple-ribbed Milkvetch

Life History: This species is only found in California and it is primarily known from the vicinity of Whitewater Canyon (the type locality) and from Dry Morongo Canyon along Highway 62, as well as from scattered occurrences farther east in the Little San Bernardino Mountains, including an anomalous, relatively high elevation, site at Key's Ranch in Joshua Tree National Park. It is restricted to sandy or gravelly soils in arid canyons. It appears that no well-established permanent population of any size has ever been found.

Population Status in the Planning Area: Most of the populations occur just outside of the planning area; but there are three locations within the western Mojave Desert: Little San Bernardino Mountains in Joshua Tree National Park (perhaps at Key's Ranch only), Big Morongo Canyon at the Riverside/San Bernardino counties line (several collections and observations), in the Whitewater River drainage within the San Gorgonio Wilderness and in Dry Morongo Canyon just north of the San Bernardino County line (several collections). There is additional habitat along the southern part of the planning area that is not well explored that may have additional populations: in the upper reaches of Mission, Dry Morongo and Big Morongo Creeks, as well as in the western lobe of Joshua Tree National Park.

Regulatory Status: Federal Endangered.

Threats Affecting the Triple-ribbed Milkvetch: Threats are not well known because this species is not well studied and it is often difficult to find in remote and rugged areas. Vehicle travel in desert canyons and washes of the Little San Bernardino Mountains is a potential threat.

3.3.8.22 White-Margined Beardtongue

Life History: This species is disjunct from its primary range and is found in the sand fields and washes north of Pisgah Crater.

Population Status in the Planning Area: This plant is found in the Pisgah Crater area. Twenty-two occurrences have been recorded. Three of these are on private lands. The BLM/Wildlands Conservancy purchase of lands from Catellus Development Corporation in

January 2000 put three occurrences into public ownership. Populations at Twentynine Palms MCAGCC have been disturbed by military activities in the past. A new population was recorded from the base in 1998.

Regulatory Status: BLM Sensitive.

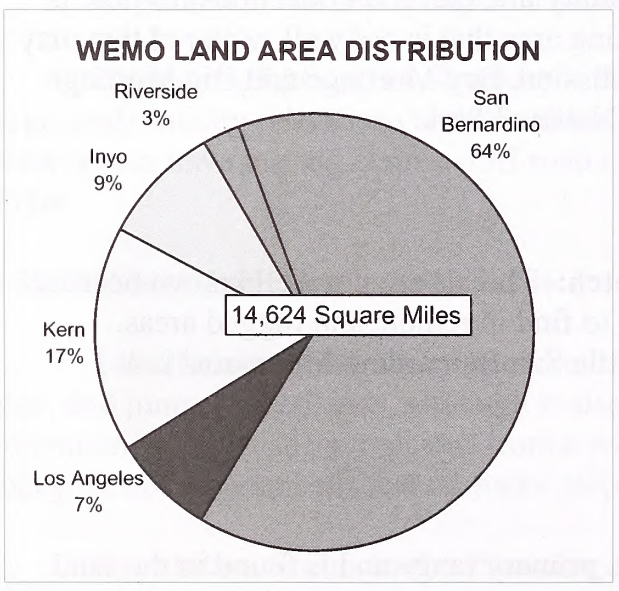
Threats Affecting the White-margined Beardtongue: Vehicle use of the occupied habitat is a threat. Maintenance of utility access roads and facilities has been a threat in the past. Military operations at Twentynine Palms MCAGCC have potential to damage the small population(s) on the base.

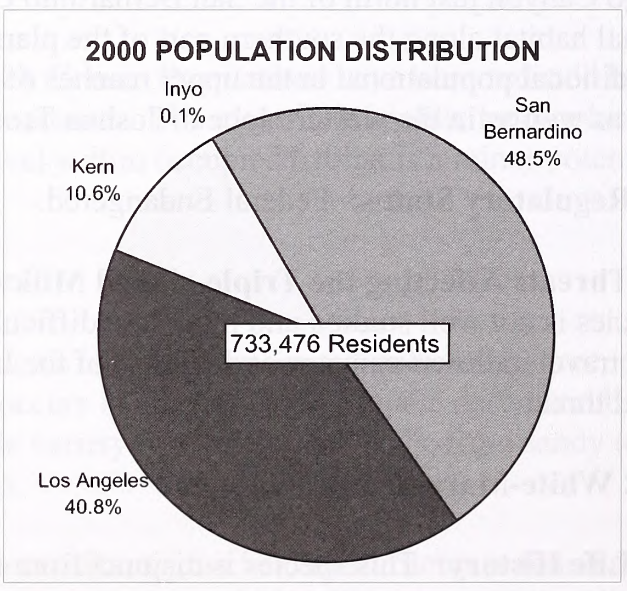
3.4 SOCIO-ECONOMIC

3.4.1 Regional Economic Profile

The following information pertaining to existing economic and demographic conditions in the panning area is excerpted from the Socio-Economic Analysis of the project alternatives, prepared by Alfred Gobar and Associates. The complete socio-economic technical report is contained in Appendix N of this FEIR/S. Further detail and technical data is contained therein.

Encompassing nearly 9.36 million acres, the planning area (also WEMO) is a substantial geographic region. This large study area includes over 733,000 residents (2000 Census) and encompasses portions of five separate counties. The corresponding land area and resident population base within each of the respective county subareas that comprise the planning area is graphically shown below.





3.4.1.1 Regional Environment

In totality, the West Mojave's existing population base is significant but is widely dispersed in scattered concentrations ranging from as few as 25,000 residents in such areas as Barstow and Ridgecrest to more than 200,000 in the Palmdale-Lancaster area of Los Angeles County and also the Victor Valley area of San Bernardino County. The West Mojave population base is too small and geographically dispersed to be realistically considered a self-generating economy, even though certain industries such as aerospace, mining, military, and government operations have long provided local employment to area residents.

The West Mojave, while relatively remote, is situated along the periphery of Southern California and its huge metropolitan population and employment base. Overall economic growth throughout the West Mojave is increasingly influenced and driven by growth trends describing the larger economic region of Southern California for a number of reasons. The six-county Southern California region (Los Angeles, Orange, San Diego, San Bernardino, Riverside, and Ventura counties) hosted 19.7 million residents and 8.0 million nonagricultural wage and salary jobs in 2001. Due to the sheer volume of employment opportunity in more developed regions of Southern California a large number of workers residing in outlying areas commute to jobs in such central locations. In 2000, about one in five workers residing in cities throughout the West Mojave commuted at least 60 minutes each way to work. By contrast, the high desert environment of the West Mojave continues to offer a diverse range of options for a growing urban population seeking recreation and leisure activities or passive relief in vast natural settings. The high desert region has attracted nearly 2.0 million visitor-trips a year for off-highway vehicle recreation and nearly 1.5 million visitors to State and National Parks in the area. Recreation travel in the West Mojave also provides support for local businesses and related jobs. Growth in employment throughout Southern California therefore constitutes one of the principal factors driving demand for household formation in outlying sub-regions, such as the West Mojave.

Historic Regional Trends

Population: A wide variety of socio-economic factors can be evaluated with regards to growth trends, but changes in population, employment, and housing reflect principal drivers of urbanization and associated economic activity. Area population growth is a product of household formation. Household formation is primarily driven by the availability of employment, with the exception of retirement households.

Total population within the six-county region of Southern California, plus Kern County, grew by 6.54 million residents over the 21-year period from 13.8 million residents in 1980 to 20.4 million residents in 2001. The resident population of Inyo County has remained relatively static since 1980 (about 18,000 residents) and is not explicitly evaluated in relation to regional trends since it hosts roughly 600 residents or less than 0.1 percent of WEMO population.

Total population throughout Southern California grew at an average annual rate of 1.84 percent. Since 1990, the rate of population growth has slowed relative to the average rate experienced over the past 21-years. Los Angeles County continues to account for the largest

share of absolute population in Southern California due to its size. The pattern of growth, however, is shifting and outlying sub-regions are capturing a greater share of total growth. Since 1980, outlying counties such as Riverside, San Bernardino, and Kern County have steadily increased their respective share of total population.

Employment: Southern California population growth trends are largely influenced by nonagricultural employment trends and related housing construction. Non-agricultural employment correlates best with household formation, associated housing demand, and population growth since a large segment of agricultural employment reflects transient and seasonal labor with limited capacity to occupy market rate housing. In addition, agricultural employment has been declining in absolute terms and as a share of total Southern California employment. For these reasons, non-agricultural employment growth will constitute a principal force driving future housing growth and urbanization in the WEMO area.

Between 1980 and 2001 nonagricultural employment in Southern California grew 34.0 percent from 5.85 million jobs in 1980 to 8.24 million in 2001. Over this period 1.57 million new jobs (net) were created between 1980 and 1990 compared to 0.86 million (net) since 1990. Aggregate employment has grown at a slower rate in absolute and relative terms since 1990, in part due to significant job losses during the early 90's. The overall slower pace of employment growth is indicative of broader trends describing the outlook of future economic growth in the region.

Not only is total employment in Southern California starting to grow more slowly, outlying areas are capturing larger shares of such growth. In 1980, Los Angeles County accounted for 62.1 percent of nonagricultural employment throughout the Southern California region, including Kern County. In 2001, Los Angeles County's respective share was down to 49.7 percent. By comparison, San Bernardino County has captured an increasing share of employment (from 4.2 percent in 1980 to 6.8 percent in 2001), while the corresponding share for Kern County has remained relatively constant (2.4 percent). Both Riverside and San Bernardino County are commonly recognized as a single metropolitan statistical area (Inland Empire) for purpose of tracking most socio-economic trends. On the basis of this definition, the Inland Empire has actually led Southern California in net employment gains since 1990 (314,400 jobs). As these trends suggest, the proportionate share of nonagricultural employment growth has been shifting over the 21-year reference period, principally from Los Angeles County to the other six counties.

Housing: Southern California housing growth trends are characterized by year-to-year volatility and shifting development activity throughout the region. Since 1980 roughly 1.93 million construction permits have been issued for new housing development. The average annual volume of development activity for all forms of housing (detached, attached, condo, apartment, etc.) is summarized in Table 3-37.

Table 3-37
Average Annual Units Constructed - All Housing

Period	Southern California								So Cal Including Kern Co.
	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	
1981-85	31,073	13,211	11,904	13,654	21,740	3,694	95,276	4,912	100,188
1986-90	50,112	20,366	23,277	21,556	27,547	4,916	147,773	4,496	152,269
1991-95	10,166	7,911	7,920	5,708	6,658	1,977	40,338	3,556	43,894
1996-00	11,963	11,379	11,799	5,927	12,353	3,265	56,686	3,008	59,694
2001	18,118	8,585	18,097	8,395	15,468	3,453	72,116	3,494	75,610
22 Yr Avg	25,611	12,902	13,656	11,410	16,824	3,488	83,890	3,925	87,815

Source: Bureau of the Census - Construction Statistics Division; Alfred Gobar Associates.

Identified trends clearly show that the volume of development activity throughout all of Southern California has dropped considerably since peak building activity during the late 80's. At that time, housing construction activity was significantly outpacing sales volume just as the Southern California economy was being impacted by the post-Cold War recession. In effect, the bottom dropped out of Southern California's aerospace and defense industry, heavily concentrated in Los Angeles County, which fueled more wide spread job losses after 1990. During the subsequent recovery period (1995 to 2000), annual job growth began to approach previous peak levels but housing development has continued at much more moderate levels. In addition, the pattern of new housing development has shifted to outlying areas of Southern California more rapidly than corresponding shifts describing non-agricultural employment growth.

Job-Housing Mix: The Southern California economy has been characterized by a shifting pattern of employment, housing, and population growth trending outward from the traditional urban centers. The Southern California's economy as a whole has effectively generated 1.20 nonagricultural wage and salary jobs per household, although this average has fluctuated in cyclical fashion. Despite substantial employment losses during the early 90's, Los Angeles County recently has been generating local jobs at a ratio approaching its long-term average rate (1.31 jobs per household). Relatively isolated employment submarkets in Ventura County and Kern County have also increased relative job-housing performance since the early 90's. The rate of local job growth in San Bernardino County and Riverside County has accelerated since 1995, but these sub-regions continue to lag the overall region in terms of jobs per household. A significant portion of housing growth within these two sub-regions continues to reflect affordable housing opportunities for workers who in turn commute to jobs in the major metropolitan employment centers.

3.4.1.2 Study Area Demographics

The West Mojave extends across large portions of four Southern California counties (Los Angeles, San Bernardino, Kern, and Inyo) which all combined host 11.7 million residents (2000 Census) or nearly 35.0 percent of the Statewide population (33.8 million residents). As a matter of course demographic traits describing an area are most often compared to corresponding traits describing a larger geographic setting of which it is a part. Roughly 80.0 to 90.0 percent of all

residents within Southern California, however, reside in areas that are substantially more developed and urbanized than is the case with the West Mojave.

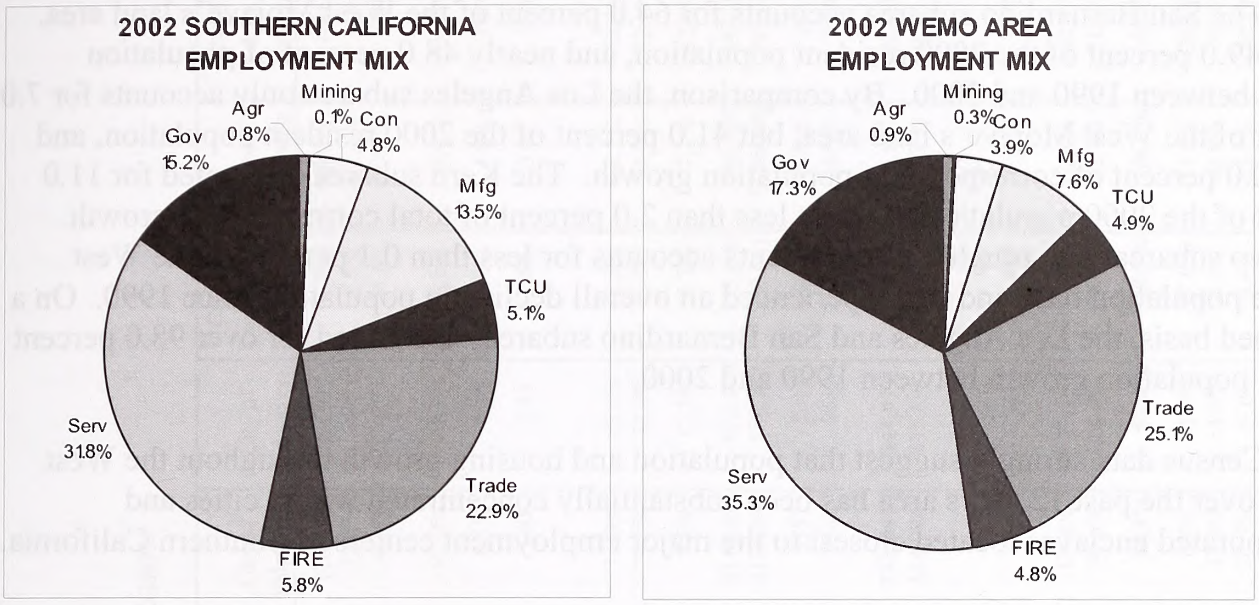
Typical population densities generally range from roughly 2,500 persons per square mile in growing suburban areas to more than 7,500 persons per square mile in urbanized areas. By comparison, the corresponding population density for the eleven West Mojave cities combined (accounting for 71.0 percent of the West Mojave population base) only averages about 680 persons per square mile (487,000 acres of land area divided by 520,000 residents in 2000). The Census Bureau utilizes a minimum threshold of 1,000 persons per square mile to denote an urbanized setting. The West Mojave is more characteristic of a large rural environment. As such, demographic traits that describe the West Mojave reflect distinctly different circumstances than is true for more urbanized portions of Southern California, thereby minimizing the usefulness of direct comparisons. Instead, the State of California, which includes a sizeable rural population, periodically serves as a comparative reference to denote overall distinctions describing West Mojave residents.

Demographic traits describing the 2000 population base of the four West Mojave subarea regions are detailed in Exhibit 8 of the Socio-Economic Analysis in Appendix N. Similar traits describing the resident population of West Mojave cities are summarized in Table 3-38.

The West Mojave consists of a relatively young population base but is aging more rapidly than the State overall and more rapidly than central metropolitan areas of Southern California. The West Mojave includes a heavy composition of families and similarly has a greater proportion of residents 20 years of age or younger. As result, there are relatively fewer small households (two persons or less). The West Mojave is still attracting a relatively large number of new households but at a slower rate than experienced through the 80's and mid-90's. The affordability of housing in the West Mojave remains a principal attraction to new households given 1 out of every 5 workers commutes 60 minutes or more to their job.

Workforce participation (workers, not jobs) among West Mojave households continues to lag the State and Southern California economy. Census data indicates there was an average of 1.11 workers (persons indicating a place of work) per household throughout the West Mojave compared to a Statewide average of approximately 1.28 workers per household. Similarly, current estimates of local employment (local jobs, as distinct from resident workers) also indicate that there are fewer job opportunities in the West Mojave (0.94 jobs per occupied household) than is true for the State economy or Southern California as a whole (1.20 jobs per household – long term average). The incidence of local job opportunities in the West Mojave, however, is comparable to other outlying regions of Southern California, including Kern County (0.92 jobs per household) and the Inland Empire (0.98 jobs per household).

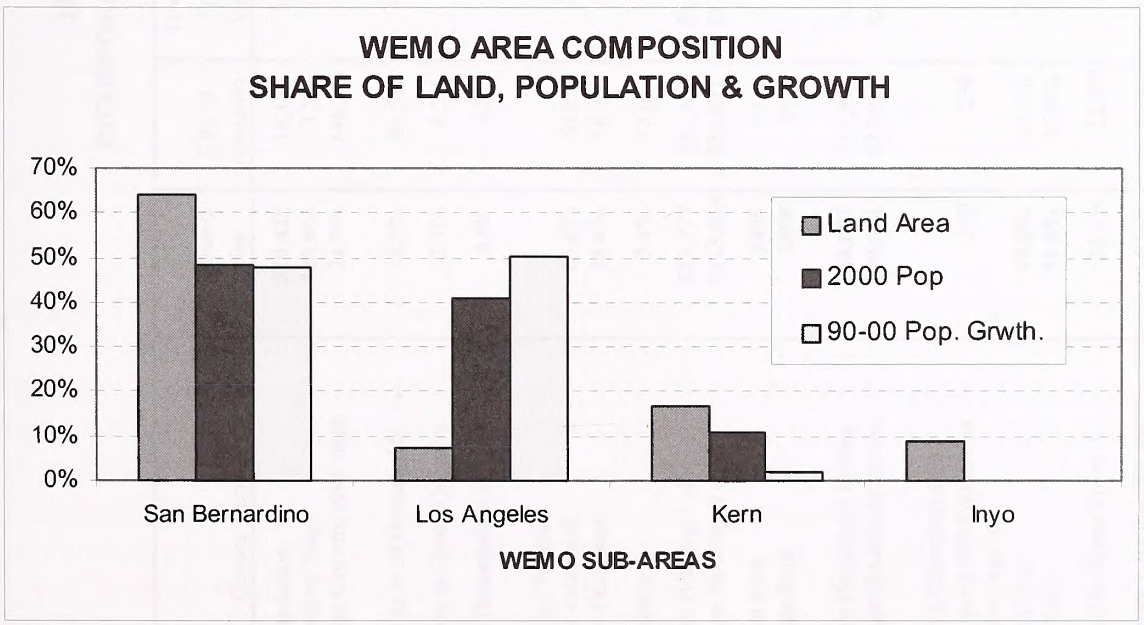
Current estimates from the California Employment Development Department and data purveyors place the 2002 employment base throughout the West Mojave at approximately 232,500 civilian jobs available to a base of 758,000 persons or 247,900 households. Surprisingly, the mix of local employment opportunities is roughly comparable to the broader mix of employment throughout Southern California as suggested below:



Source: Alfred Gobar Associates; California Employment Development Department; Claritas, Inc.

Factors that distinguish the current employment base of the West Mojave include a higher proportion of service and trade sector jobs (consistent with rural and emerging growth areas). The West Mojave also has a moderately higher mix of government jobs, reflecting the historical role of Federal and State agencies in the region. The manufacturing base within the West Mojave is significantly underrepresented by comparison to the broader Southern California economy. Agriculture (including grazing activities) and mining have a long and proud history in the West Mojave but account for little more than 1.0 percent of current employment opportunities or about 2,500 jobs in the area.

Demographic traits and growth trends describing the West Mojave overall can vary considerably among the four subareas. This is particularly evident with respect to the distribution of population and land area throughout the West Mojave as summarized below:



The San Bernardino subarea accounts for 64.0 percent of the West Mojave's land area, nearly 49.0 percent of the 2000 resident population, and nearly 48.0 percent of population growth between 1990 and 2000. By comparison, the Los Angeles subarea only accounts for 7.0 percent of the West Mojave's land area, but 41.0 percent of the 2000 resident population, and over 50.0 percent of corresponding population growth. The Kern subarea accounted for 11.0 percent of the 2000 population base but less than 2.0 percent of total corresponding growth. The Inyo subarea with roughly 600 residents accounts for less than 0.1 percent of the West Mojave population base and has experienced an overall decline in population since 1990. On a combined basis, the Los Angeles and San Bernardino subareas accounted for over 98.0 percent of total population growth between 1990 and 2000.

Census data strongly suggest that population and housing growth throughout the West Mojave over the past 12 years area has been substantially concentrated within cities and unincorporated enclaves located closest to the major employment centers of Southern California.

TABLE 3-38
2000 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	City of California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Total Population	**520,428**	18,130	54,239	21,119	8,385	62,582	118,718	116,670	24,927	14,764	64,029	16,865
% Share of Total	**100.0%**	3.5%	10.4%	4.1%	1.6%	12.0%	22.8%	22.4%	4.8%	2.8%	12.3%	3.2%
Population Growth (1990-2000)	**24.9%**	146.6%	17.2%	-4.2%	39.8%	22.2%	22.4%	47.5%	-9.7%	24.5%	24.2%	1.7%
Families as % of Households	**75.5%**	81.5%	77.4%	68.7%	73.6%	79.0%	72.4%	82.0%	68.1%	68.2%	76.0%	64.6%
Population in Group Quarters	**2.1%**	8.2%	0.7%	1.9%	0.7%	0.5%	5.9%	0.1%	1.2%	0.3%	1.0%	1.8%
Average Household Size	**3.00**	3.53	2.90	2.71	2.72	3.12	2.92	3.40	2.51	2.60	3.03	2.38
Housing by Tenure												
Owner-Occupied	**65.6%**	63.8%	70.0%	54.1%	67.1%	72.3%	61.4%	71.0%	63.0%	43.3%	65.1%	68.0%
Renter-Occupied	**34.4%**	36.2%	30.0%	45.9%	32.9%	27.7%	38.6%	29.0%	37.0%	56.7%	34.9%	32.0%
Unit Vacancy	**9.4%**	15.0%	8.0%	16.5%	13.8%	6.5%	8.4%	7.6%	13.1%	18.7%	7.1%	12.6%
Median Housing Value	**$89,377**	$81,700	$112,700	$75,700	$81,900	$95,900	$103,700	$116,400	$72,400	$75,400	$98,700	$83,200
Average Housing Value	**$113,064**	$84,431	$129,408	$82,575	$84,607	$107,287	$119,696	$129,805	$80,712	$79,641	$106,300	$97,088
Median Rent	**$495**	$391	$483	$418	$450	$526	$563	$551	$418	$416	$506	$421
Average Rent	**$498**	$412	$501	$417	$416	$491	$548	$565	$412	$343	$505	$430
Median Household Income	**$40,095**	$31,594	$40,421	$35,069	$45,735	$40,201	$41,127	$46,941	$44,971	$31,178	$36,187	$30,420
Average Household Income	**$49,051**	$35,912	$51,299	$43,671	$53,620	$47,898	$51,080	$54,994	$53,898	$37,843	$43,254	$38,361
Workforce Characteristics												
Workers per 1,000 Population	**359**	**256**	**357**	**373**	**395**	**351**	**357**	**362**	**442**	**419**	**344**	**340**
Occupation (Age 16+)												
White Collar	**69.0%**	63.1%	70.3%	68.3%	69.0%	65.4%	70.7%	69.4%	73.1%	70.1%	67.9%	68.9%
Blue Collar	**31.0%**	36.9%	29.7%	31.7%	31.0%	34.6%	29.3%	30.6%	26.9%	29.9%	32.1%	31.1%
Worked in Home Town	**35.4%**	**22.0%**	**28.4%**	**51.3%**	**24.3%**	**26.5%**	**44.7%**	**26.3%**	**58.4%**	**28.7%**	**36.7%**	**44.0%**
Commute Less than 10 min	**14.1%**	5.3%	11.0%	28.3%	13.4%	9.0%	16.2%	8.9%	35.5%	17.1%	11.5%	20.3%
Commute 10-30 min	**42.5%**	42.1%	49.6%	40.7%	42.9%	39.0%	45.2%	33.9%	51.6%	65.1%	42.8%	34.5%
Commute 30-60 min	**19.9%**	29.3%	17.2%	22.3%	34.8%	27.2%	16.4%	20.3%	6.1%	8.4%	23.1%	30.3%
Commute 60 min or more	**20.5%**	20.7%	17.8%	6.8%	7.3%	20.7%	19.6%	34.2%	4.2%	7.2%	19.6%	11.2%

Source: Alfred Gobar Associates; U.S. Bureau of the Census; AnySite Online.

3.4.1.3 Study Area Growth Capacity

Economic growth within a given area is ultimately affected by the underlying capacity to host additional amounts of land use development where related residential, employment, educational, and leisure activities are to occur. The underlying holding capacity of the area is greatly influenced by General Plan policy that defines the location, supply, and intensity of land use available to host economic activity. The ultimate growth capacity of the West Mojave is largely defined by General Plan land use policy of 15 separate jurisdictions (11 cities and 4 counties). To determine the land use capacity of West Mojave land use designations were quantified and classified by type and intensity. Because the West Mojave encompasses such a vast geographic area special attention was placed on determining the specific intensity of permitted land use rather than estimating land use intensity on the basis of common nomenclature used to describe type of land use. Specific quantities and corresponding population and employment levels used to describe the growth capacity of the West Mojave are detailed in Exhibit 9 and Exhibit 10 of the Socio-Economic Analysis in Appendix N.

Overall, roughly 1.78 million acres of land area throughout the West Mojave is designated for residential land use at a target capacity of approximately 1.58 million residential dwellings. In all about 240,000 acres of land area is designated for a variety of non-residential land use such as office, retail, industrial, and institutional development. The balance of area, or roughly 7.0 million acres, is designated for open space, utility easements, resource production, agriculture, military installations, conservation land, etc. Overall, the 15 affected local agency jurisdictions have General Plan policies in place guiding the ultimate use and development of roughly 9.0 million acres. With respect to population and employment, the designated supply of residential and nonresidential land use has the capacity to support roughly 4.86 million residents and 3.09 million local jobs if all West Mojave properties are developed and utilized according to General Plan policy.

In terms of economic realities expected to influence growth opportunities throughout the West Mojave over the long haul, current General Plan policies in aggregate are out of balance. The West Mojave is effectively over-supplied in terms of the amount of non-residential land required for the housing unit capacity currently designated. Conversely, it might be argued there exists an undersupply of designated housing capacity needed to warrant the amount of non-residential land use planned. The market reality is such that single-family detached housing will represent the dominant form of residential constructed throughout the West Mojave during the 30-year life of the habitat conservation plan (HCP) project.

If all West Mojave land uses were developed according to General Plan policy, the area would effectively host 1.95 local jobs per housing unit (rough equivalent of 2.15 jobs per occupied household). Since 1990, overall workforce participation throughout the West Mojave has been declining from about 1.16 workers (including self-employed) per household to 1.11 workers per household in 2000, with about one-fifth of these workers commuting to jobs in the metropolitan regions of San Bernardino and Los Angeles County. The corresponding rate of workforce participation for the State has been increasing from 1.63 workers per household in 1990 to 1.71 workers per household in 2000. To fully develop the designated supply of non-residential land area in the West Mojave, workforce participation trends in the area would need

to undergo a dramatic reversal to the point of exceeding equilibrium levels describing the Statewide economy. A more balanced policy mix of residential and non-residential land use throughout the West Mojave suggests limiting office, retail, industrial, and institutional land use (excluding local school sites) to roughly 160,000 acres.

Recent growth trends and the long-term outlook for housing development is summarized in Table 3-39 based on Census reported changes in area housing.

Table 3-39
West Mojave Housing Development Outlook
Effective Mix Of Detached Vs Higher Density Product

TYPE HOUSING	BUILDOUT	2000 EST	1990 EST	CHG 2000 BUILDOUT	CHG 1990-2000
All Housing	1,580,000	271,250	230,125	1,308,750	41,125
Higher Density	253,000	41,775	38,900	211,225	2,875
% High Density	16.0%	15.4%	16.9%	16.1%	7.0%

Source: Bureau of Census; Alfred Gobar Associates.

3.4.1.4 Study Area Market Share

Residential construction constitutes the form of land use likely to result in the greatest amount of permanent ground disturbance (subdivision grading) among common development activities closely associated with the future urbanization of the West Mojave (retail, office-institutional, and industrial land use reflecting the other principal urban land forms). During the most recent 10-year period of construction activity, the effective share of building permits issued within the principal growth locations of the West Mojave is summarized in Table 3-40.

Table 3-40
Residential Permits – 10-Year Average Share/Mix

	ALL UNITS	SFD	MF/OTHER
San Bernardino Subarea	52.0%	52.8%	25.5%
Los Angeles Subarea	45.9%	45.0%	61.5%
Kern Subarea	2.1%	2.2%	13.0%
WEMO Overall	100.0%	100.0%	100.0%
WEMO Unit Mix	100.0%	89.6%	10.4%

Source: U.S. Bureau of the Census - Residential Construction Branch.

As shown, within the last 10 years, the San Bernardino subarea has accounted for the largest share of total permits, followed closely by the Los Angeles subarea.

The 10-year average share of permit activity in each of the subareas described above is not static but in fact reflects a shifting pattern of growth. Overall, the total share of housing activity in the San Bernardino and Kern subareas has been declining, while the corresponding share occurring in the Los Angeles subarea has been growing.

Long-term growth in the West Mojave is not solely driven by regional employment gains but is also influenced by increases in the local population base, which generates population-serving employment and attendant housing demand from jobs created.

Housing submarket locations with relatively strong housing demand tend to support higher average product pricing, reflecting market preferences of prospective residents. Table 3-41 summarizes the estimated average unit value for new single-family detached homes issued building permits during the first eight months of 2002.

Table 3-41
West Mojave Average Housing Value –
New Single Family Detached Units

	2002 AVG.	10-YR. INDEX	2002 INDEXED AVERAGE	
WEMO Location	SFD Value	vs. WEMO	vs. 1992	vs. WEMO
Palmdale	$242,800	1.05	1.60	1.17
Victorville	$232,500	0.94	1.74	1.12
Lancaster	$211,800	1.09	1.37	1.02
Hesperia	$203,000	0.95	1.28	0.93
Apple Valley	$189,800	1.05	1.22	0.91
California City	$164,600	0.88	1.34	0.79
Ridgecrest	$161,000	0.98	1.42	0.79
Yucca Valley	$153,300	0.83	1.14	0.79
Barstow	$139,500	1.01	1.07	0.67
29 Palms	$112,900	0.75	0.91	0.54
Adelanto	$91,100	0.83	1.28	0.44
San Bernardino Subarea	$192,100	0.91	1.60	0.93
Los Angeles Subarea	$231,800	1.01	1.37	1.12
Kern Subarea	$163,400	0.89	1.38	0.79
WEMO Overall	$207,600	1.00	1.54	1.00
WEMO Counties (3)	$257,900	1.29	1.39	1.24

Source: U.S. Bureau of the Census - Residential Construction Branch; Alfred Gobar Associates.

Within theWest Mojave, cities and housing submarket locations closest to metropolitan employment centers have consistently realized higher average unit values. Indicated pricing patterns are symptomatic of demand preferences expected to drive future growth. The City of Adelanto reflects the notable exception. Historically overlooked, Adelanto is now experiencing increased housing activity due to its location along the principal growth vector of the City of Victorville. Overall, the West Mojave remains a price-competitive market in relation to the broader Southern California housing market.

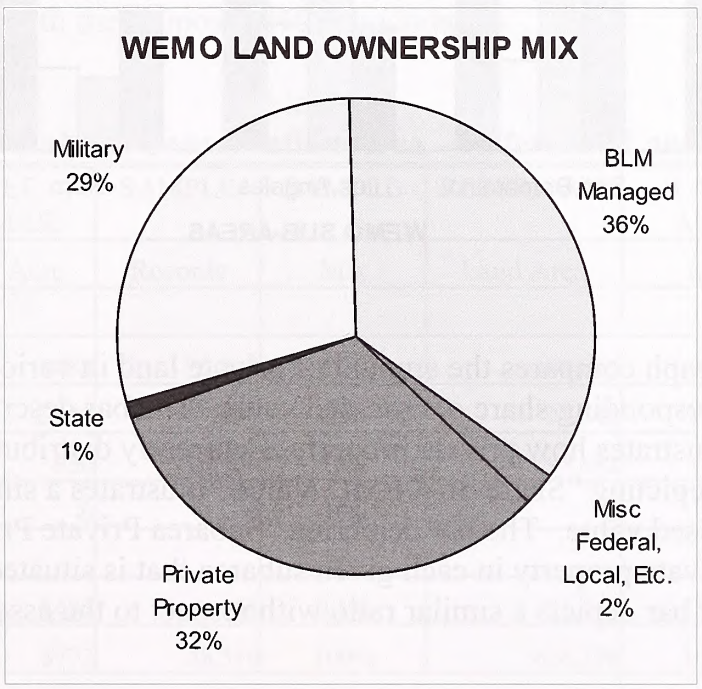
During the past 10 years, West Mojave has captured nearly a 14.0 percent average share of all new home construction activity within the four counties surrounding the West Mojave (Los Angeles, San Bernardino, Kern, and Inyo County).

3.4.1.5 Study Area Property Valuation

Property valuation throughout the West Mojave represents an important consideration in relation to the HCP program. The assessed value of West Mojave property largely determines the amount of property tax revenue appropriated to each of the eleven West Mojave cities and four county governments in order to provide necessary public services (police, fire, health & safety, cultural and community, etc.). The assessed value of property within selected portions of the West Mojave, namely the Habitat Conservation Areas (HCA's), also determines the mitigation fee that would be imposed within the HCP compensation framework for Allowable Ground Disturbance (AGD) and incidental taking permits needed to facilitate future development and generate funds to acquire additional habitat area. These two areas of consideration are important for the following reasons. As the HCP is implemented and privately owned property in the HCA's is purchased and removed from the tax rolls, affected City and County governments will need to forego corresponding property tax revenue used to support public service responsibilities. The HCP mitigation fee establishes a definitive expense that that must be shouldered by site-specific development in order to eliminate case-by-case cost uncertainties associated with enforcement of current endangered species regulations (CESA and FESA). The following discussion is supplemented by additional exhibits and discussion in the Socio-Economic Analysis (Appendix N to this FEIR/S).

3.4.1.5.1 Subarea Valuation

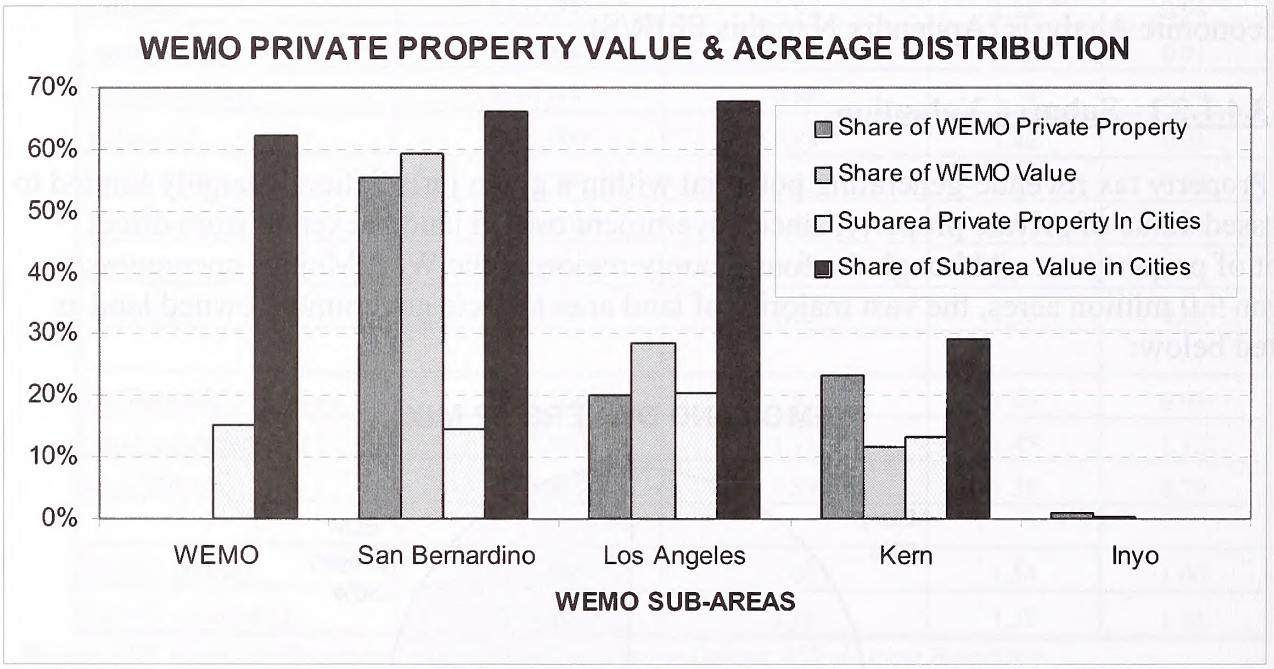
Property tax revenue-generating potential within a given jurisdiction is largely limited to the assessed value of private property, since government owned land is exempt from direct payment of property tax. Although the four-County region of the West Mojave encompasses more than 9.0 million acres, the vast majority of land area reflects government owned land as illustrated below:



As shown, only 32.0 percent or 2.9 million acres of the West Mojave is privately owned and subject to property tax. Under current taxing regulations, private property is taxed according to a basic levy equal to 1.0 percent of its assessed value. City and County governments are allocated a portion of the property tax proceeds, along with other government service agencies (school districts, flood control districts, vector control districts, cemetery districts, library districts, etc.). The relative supply of private property within a given jurisdiction affects the amount of fiscal operating revenue that can be anticipated in the form of property tax versus other fiscal sources (sales tax, transient occupancy tax, franchise fees, motor vehicle fees, government subventions, service revenue, fines and forfeitures, etc.).

The private property portion of the study area accounts for the greatest share of total land area within the Los Angeles Subarea at 89.0 percent, followed by the Kern Subarea at 46.0 percent, the San Bernardino Subarea at 27.0 percent, and finally the Inyo Subarea at 4.0 percent.

The overall 2002 assessed value generating property tax revenue is estimated at roughly $22.2 billion. The relative distribution of private property acreage and taxable value (see Exhibit 11 in the Socio-Economic Analysis in Appendix N is graphically summarized as follows:



The above graph compares the amount of private land in various subareas of the West Mojave and the corresponding share of assessed value. The bar describing the "Share of WEMO Private Property" illustrates how private property is currently distributed across the four subareas. The bar depicting "Share of WEMO Value" illustrates a similar distribution with respect to total assessed value. The bar depicting "Subarea Private Property in Cities" identifies the proportion of private property in each given subarea that is situated within a City limit boundary. The final bar depicts a similar ratio with respect to the assessed value of such private property.

The supply of private property in the San Bernardino and Los Angeles subareas represents 55.0 and 20.0 percent of total private land in the West Mojave. The corresponding share of private property value, however, equates to nearly 60.0 percent and nearly 30.0 percent of the total assessed value of the West Mojave. In general, private property in the San Bernardino and Los Angeles subareas is being assessed at a higher value per acre than is the case for private property in Kern and Inyo County.

For the West Mojave overall, only about 15.0 percent of all private property is located within a City but accounts for 62.0 percent of total assessed value. A substantial portion of West Mojave assessed value (principal determinant of property tax revenue) is concentrated on relatively limited amounts of private property located within existing City jurisdictions.

3.4.1.5.2 Habitat Conservation Area Valuation

To account for vast distinctions that might influence average land value throughout the West Mojave, a large sample of 2002 property data exceeding 500,000 records was compiled from County Assessor records as procured from electronic appraisal data purveyors. In effect, a data sample was compiled that consists of all property records available from Assessor Map Book records roughly approximating the entire West Mojave in order to reduce bias that may be inherent to a limited sampling randomly selected from diverse micro-market environments. The sample set used to estimate the average value of private unimproved land within the HCA is based on a smaller subset of roughly 38,500 data records due to vast amounts of government owned lands in these areas.

The appropriate mitigation fee reflects an average value reference describing lands to be acquired for habitat conservation, specifically unimproved private property within the proposed HCA. Table 3-42 below summarizes the estimated average value of unimproved private property closely associated with the proposed HCA boundaries.

Table 3-42
West Mojave Habitat Conservation Area – Reference Land Value

	REF. VALUE	SAMPLE	SAMPLE	REFERENCE	LAND AREA	EST. OF PRIVATE
Private Lands/Subareas	Per Acre	Records	Mix	Land Area	Mix	Land Value
2002 Assessed Value						
San Bernardino	$489	20,208	52%	401,005	64%	$196,091,000
Los Angeles	2,587	7,755	20%	77,842	12%	201,377,000
Kern	650	10,509	27%	95,682	15%	62,193,000
Inyo[1]	0	0	0%	0	0%	0
Previously Acquired						
LR2000 Database	$457	38	0.1%	51,769	8%	$23,658,000
Critical Habitat Lands:	$772	38,510	100%	626,298	100%	$483,319,000
Source: County Assessor Records; BLM LR2000 Database; Alfred Gobar Associates						
Note: The designated HCA within Inyo County specifically excludes privately held property.						

HCA boundaries in the Inyo subarea specifically exclude any private property holdings. As a result, no effective weighting has been assigned to Inyo County portions of the HCA. The estimated 2002 average assessed land value describing unimproved private property throughout the HCA's equates to $770 per acre.

3.4.2 Livestock Grazing

There are a total of 31 public land grazing allotments (a designated area suitable for grazing) within the West Mojave planning area (see map 3-18). The type of livestock and type of forage allocation for allotments have been designated in the BLM's CDCA Plan. Allotments are designated as ephemeral, perennial, or ephemeral/perennial based on the type of forage that is available on the allotment. Cattle, sheep, and, horses, or a combination of these may be authorized to graze on an allotment. Table 3-43 indicates the livestock type and forge type designated for each allotment.

Table 3-43
Livestock Type and Forage Type for Allotments

ALLOTMENT NAME	TYPE OF LIVESTOCK	FORAGE TYPE
Antelope Valley	Sheep	Ephemeral
Bissell	Sheep	Ephemeral
Boron	Sheep	Ephemeral
Buckhorn Canyon	Sheep	Ephemeral
Cady Mountain	Cattle	Perennial
Cantil Common	Sheep	Ephemeral
Cronese Lake	Cattle	Ephemeral/Perennial
Darwin	Horses	Perennial
Double Mountain	Cattle	Ephemeral
Gravel Hills	Sheep	Ephemeral
Hansen Common	Cattle/Sheep	Ephemeral/Perennial
Harper Lake	Cattle	Ephemeral/Perennial
Johnson Valley	Sheep	Ephemeral
Lacey-Cactus-McCloud	Cattle	Perennial
Lava Mountain	Sheep	Ephemeral
Monolith-Cantil	Sheep	Ephemeral
Oak Creek	Cattle	Perennial
Olancha Common	Cattle	Perennial
Ord Mountain	Cattle	Ephemeral/Perennial
Pilot Knob	Cattle	Ephemeral
Rattlesnake Canyon	Cattle	Ephemeral/Perennial
Round Mountain	Cattle	Ephemeral/Perennial
Rudnick Common	Cattle/Sheep	Ephemeral/Perennial
Shadow Mountain	Sheep	Ephemeral

ALLOTMENT NAME	TYPE OF LIVESTOCK	FORAGE TYPE
Spangler Hills	Sheep	Ephemeral
Stoddard Mountain	Sheep	Ephemeral
Superior Valley	Sheep	Ephemeral
Tunawee Common	Cattle/Sheep	Perennial
Valley Well	Horses	Ephemeral/perennial
Walker Pass Common	Cattle	Ephemeral/perennial
Warren	Sheep	Perennial

The allotments are classified as either Taylor Grazing Act Section 3 grazing permits or Section 15 grazing leases. Allotments with perennial forage have an established limit of forage based on the quality and quantity of perennial plants, stated in animal unit months (AUMs) for a defined period of grazing use. An AUM is a measure of perennial or ephemeral feed that will support a cow and its calf, a ewe and its lambs, or a bull for one month. Perennial forage consumption is typically authorized at the same level from year to year unless forage production does not meet seasonal norms. In contrast, grazing use in allotments with ephemeral forage does not have an established level or specified period of use. Instead the amount and length of grazing use is based on ephemeral production and determined just prior to authorizing the grazing use.

In most cases, BLM authorizes grazing by permit or lease for a period of 10 years. A shorter period of time is sometimes issued for special circumstances, such as to accommodate a shorter-term lease of the base property or when the Authorized Officer determines that a shorter-term authorization is in the best interest of range management. Additionally, non-renewable grazing authorization may be issued for special short-term needs such as trailing, or when there is short-term surplus forage available for grazing. All permits and leases are subject to modification and to annual adjustments. Such modifications are implemented through consultation between the permittee or lessee and the BLM.

The permit or lease identifies the number, kind and/or type of livestock that may graze the allotment, and the grazing period (usually with specific beginning and ending dates). In addition, many permits and leases also require adherence to prescribed grazing prescriptions in the form of grazing systems such as deferred, deferred-rotation, or rest-rotation. Other authorizations may have conditions pertaining to turnout dates based on vegetation conditions. Some permittees and lessees have specific grazing utilization standards and other specified conditions to protect site-specific areas, such as riparian areas, wildlife habitat, and special status plant populations. Usually these conditions have been developed in consultation and cooperation between BLM and the livestock operator in the form of an allotment management plan or other planning effort.

Often there are occasions when the permittee or lessee elects to graze less than the full amount of grazing authorized for the grazing season. Sometimes this is due to environmentally related factors such as droughts or fires, and in other cases it may be to accommodate the livestock operator's need to adjust livestock numbers for marketing or livestock husbandry

purposes. Normally the BLM will authorize the requested amount of non-use on a short-term basis. In some situations the BLM may temporarily authorize another qualified applicant to graze the amount of authorized non-use in an allotment, but this is seldom done.

Grazing use of perennial vegetation in all allotments is expected to continue except where the permittee or lessee voluntarily relinquishes their lease or permit. Overall, livestock producers have voluntarily reduced stocking rates for much of the 1990s, resulting in less livestock use than the lease or permit allows. Both cattle and sheep grazing have been authorized under existing biological opinions in desert tortoise habitat (see Appendix Q).

Since 1992, BLM Barstow Field Office lessees with allotments classified as ephemeral/ perennial have not requested, nor has grazing been authorized for, ephemeral forage or temporary non-renewable (TNR) perennial forage. During the same period, lessees and permittees in the BLM Ridgecrest Field Office with ephemeral/ perennial allotments have routinely requested ephemeral authorizations, and have requested and been authorized to use TNR perennial forage. The authorization of ephemeral sheep grazing is common in both areas when sufficient ephemeral forage production occurs, although the number of sheep has declined over the last 10 years.

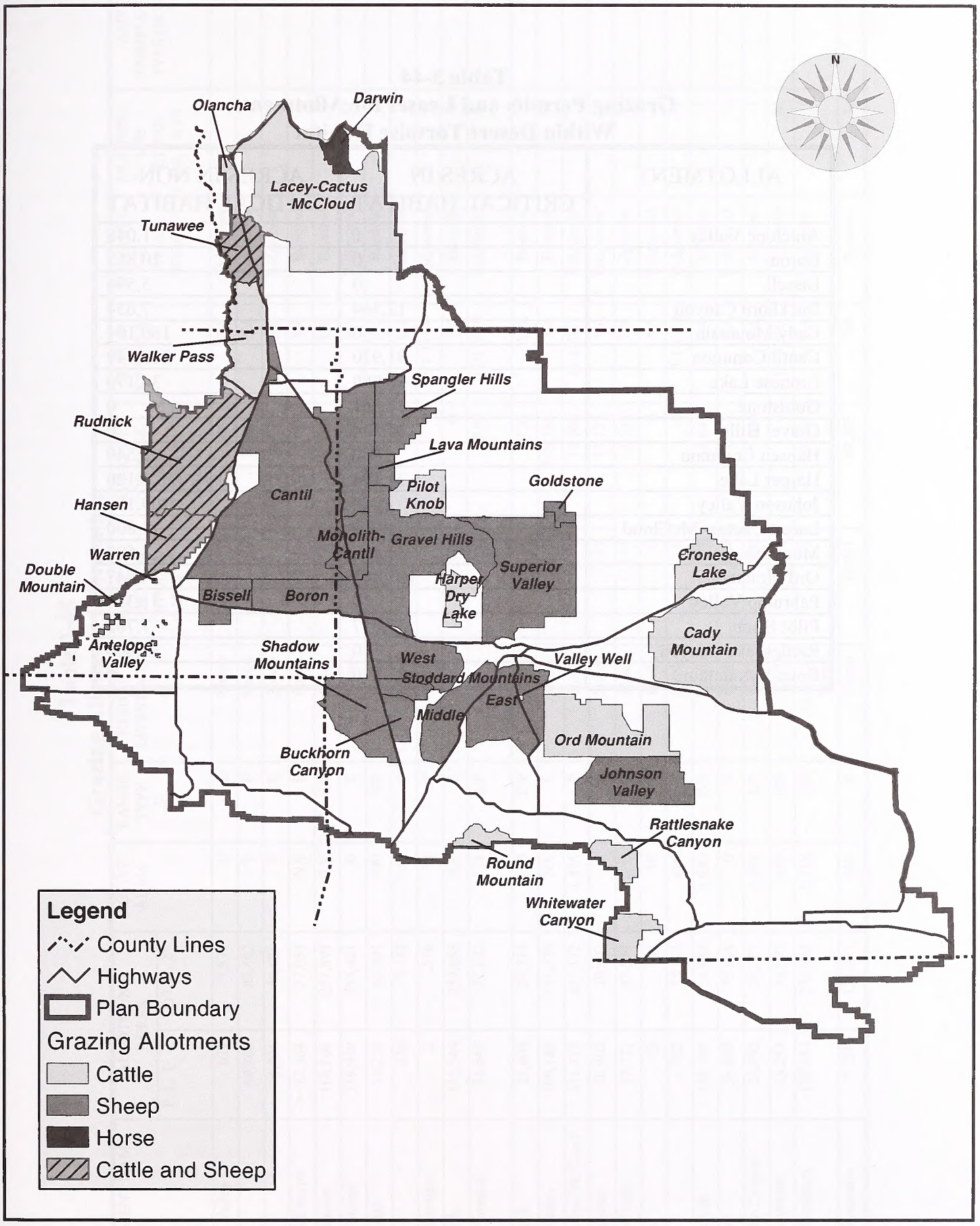
Fewer range improvements have been installed in the last 10 years than in prior years. Installation of new improvements is based on a case-by-case analysis and available funding. Periodic and annual maintenance is required on existing facilities. Some range improvements are located in designated wilderness areas, primarily on public lands administered by the BLM Ridgecrest Field Office. Ongoing maintenance of existing improvements coupled with the addition of new infrastructure has marginally increased demands for maintenance.

The vast majority of grazing allotments is within habitat and/or designated critical habitat for the desert tortoise. Table 3-44 lists the current grazing permits and leases within desert tortoise habitat in the planning area.

Allotment Management Plans (AMPs) have been prepared for about 42 percent of the allotments. Most of the AMPs apply to Ridgecrest Field Office allotments.

Table 3-45 presents information on each cattle and sheep grazing allotment. Appendix O includes a profile of each allotment, and a table detailing past livestock use of the allotment.

Grazing Allotments



West Mojave Plan FEIR/S
Map 3-18

Scale: 1 : 1,750,000

0 10 20 30 Km

0 10 20 30 Miles

7/29/04

Table 3-44
Grazing Permits and Leases for Allotments
Within Desert Tortoise Habitat

ALLOTMENT	ACRES IN CRITICAL HABITAT	ACRES IN NON-CRITICAL HABITAT
Antelope Valley	0	1,048
Boron	0	10,868
Bissell	0	5,596
Buckhorn Canyon	12,364	7,634
Cady Mountain	0	160,104
Cantil Common	91,930	318,949
Cronese Lake	30,080	34,170
Goldstone	11,061	0
Gravel Hills	135,544	0
Hansen Common	0	3,549
Harper Lake	21,194	5,120
Johnson Valley	0	109,186
Lacey-Cactus- McCloud	0	1,800
Monolith- Cantil	33,193	4,592
Ord Mountain	102,141	34,047
Pahrump Valley	0	31,338
Pilot Knob	37,857	7,762
Rattlesnake Canyon	0	12,800
Round Mountain	0	0

Table 3-45
Grazing Allotment Information

ALLOTMENT NAME	ALLOTMENT ACRES		ACTIVE AUMS	RANGE TYPE 3/	KIND OF LIVESTOCK	ACRES OF TORTOISE CRITICAL HABITAT	ACRES OF TORTOISE NON-CRITICAL HABITAT	SEASON OF USE 4/	MANAGING FIELD OFFICE	MULTIPLE USE CLASS (M, I & C)	AMP COMPLETED (YES OR NO)
	P. L. 1/	TOTAL 2/									
Antelope Valley	627	7,871	0	E	Sheep	0	1,048	NA	Ridgecrest	C	No
Boron	10,868	82,892	0	E	Sheep	0	10,868	NA	Ridgecrest	C	No
Bissell	5,596	48,889	0	E	Sheep	0	5,596	NA	Ridgecrest	C	No
Buckhorn Canyon	12,364	27,053	NA	E	Sheep	12,364	7,634	NA	Barstow	C	No
Cady Mountain	160,104	231,897	0 5/	E/P	Cattle	0	160,104	Y-L	Barstow	I	Yes
Cantil Common	318,949	555,421	0	E	Sheep	91,930	318,949	NA	Ridgecrest	M	Yes
Cronese Lake	54,250	65,304	500	E/P	Cattle	30,080	34,170	Y-L	Barstow	I	Yes
Darwin	430	7,232	44	P	Horses	0	0	Y-L	Ridgecrest	I	Yes
Double Mountain	2	576	38	P	Cattle	0	0	5/1-11/30	Ridgecrest	C	No
Gravel Hills	135,544	230,165	NA	E	Sheep	135,544	0	NA	Barstow	C	Yes
Hansen Common	34,848	72,102	354	E/P	Cattle & Sheep	0	3,549	12/1-9/30	Ridgecrest	M	Yes
Harper Lake	21,602	26,314	600	E/P	Cattle	21,194	5,120	Y-L	Barstow	I	Yes
Johnson Valley	109,186	118,320	NA	E	Sheep	0	109,186	NA	Barstow	I	No
Lacey-Cactus-McCloud	421,172	421,172	1,425	P	Cattle	0	18,000	11/1-5/31	Ridgecrest	I	Yes
Lava Mountain	20,902	20,902	0	E	Sheep	2,165	18,737	NA	Ridgecrest	M	No
Monolith-Cantil	37,771	47,553	0	E	Sheep	33,193	4,592	NA	Ridgecrest	I	No
Oak Creek	23	177	16	P	Cattle	0	0	NA	Ridgecrest	I	No
Olancha	1,582	15,876	600	P	Cattle	0	0	4/1-6/30	Ridgecrest	M	Yes
Ord Mountain	136,188	154,848	3,632	E/P	Cattle	102,141	34,047	Y-L	Barstow	I	Yes
Pilot Knob	38,994	45,619	0	E	Cattle	37,857	7,762	NA	Ridgecrest	I	No
Rattlesnake Cnayon	26,832	28,757	1,081	E/P	Cattle	0	12,800	Y-L	Barstow	I	No
Round Mountain	15,253	18,093	680	E/P	Cattle	0	0	12/1-3/31	Barstow	I	No
Rudnick Common	150,154	236,184	6,218	E/P	Cattle & Sheep	0	62,503	Y-L	Ridgecrest	I	Yes
Shadow Mountain	52,258	121,677	NA	E	Sheep	35,013	69,395	NA	Barstow	M	No

ALLOTMENT NAME	ALLOTMENT ACRES		ACTIVE AUMS	RANGE TYPE 3/	KIND OF LIVESTOCK	ACRES OF TORTOISE CRITICAL HABITAT	ACRES OF TORTOISE NON-CRITICAL HABITAT	SEASON OF USE 4/	MANAGIN G FIELD OFFICE	MULTIPLE USE CLASS (M, I & C)	AMP COMPLETED (YES OR NO)
	P. L. 1/	TOTAL 2/									
Spangler Hills	57,695	69,141	0	E	Sheep	0	54,143	NA	Ridgecrest	C	No
Stoddard Mountain	190,186	312,045	NA	E	Sheep	112,772	126,202	NA	Barstow	M	Yes
Superior Valley	169,200	236,316	NA	E	Sheep	232,507	0	NA	Barstow	C	No
Tunawee Common	51,729	55,931	1,540	E/P	Cattle & Sheep	0	1,800	2/16-5/31	Ridgecrest	I	No
Valley Well	480	480	24	E/P	Horses	0	0	Y-L	Barstow	C	No
Walker Pass Common	88,158	96,974	3,368	E/P	Cattle	0	32,058	11/1-6/30	Ridgecrest	I	Yes
Warren	4	584	55	P	Sheep	0	0	Y-L	Ridgecrest	M	No

1/ Acres of Public Land in the grazing allotment.

2/ The acres of private, State, BLM, and other ownerships that comprise the area of the grazing allotment.

3/ Those allotments classified as ephemeral (E) produce forage from primarily ephemeral (annual) plants. Those allotments classified as perennial (P) produce forage from perennial grass and shrubs. Those allotments with ephemeral and perennial (E/P) forage have a mixture of both range (forage) types.

4/ The period livestock typically graze forage on the allotment. Grazing use on some allotments is authorized to occur all Ayear-long≅ or Y-L. The grazing period of use does not apply (NA) to ephemeral allotments because grazing use occurs when forage is available.

5/ The 1982 California Desert Conservation Area Plan Amendment process authorized 2,010 AUMs of perennial forage for the Cady Mountain Allotment.

3.4.3 Mineral Potential and Development

This section describes (1) the mineral potential of the western Mojave Desert; (2) strategic and critical minerals found in the planning area; (3) the region's most important deposits, (4) current and historic mineral commodity production; (5) issues unique to Coolgardie Mesa, and (6) restoration and reclamation procedures. Additional materials, including a description of mineral management programs adopted by BLM, state and local governments, can be found in Appendix P.

3.4.3.1 Mineral Potential

The Southern California region, including portions of the Mojave Desert, is one of the most highly mineralized areas in the United States. The minerals are grouped into four categories: metallic minerals, industrial/nonmetallic minerals, energy minerals, and construction materials. These are classed on public lands by disposal categories that include: locatable, leaseable, and saleable. Current management practices are described in part 3.4.3.6. Mineral potential maps (Maps 3-19, 3-20, 3-21 and 3-22) show zones of moderate and high potential for occurrence of mineral resources[31].

According to the U.S. Bureau of Mines, undiscovered mineral deposits likely exist within the western Mojave Desert, with quantities and grades of minerals that would support profitable development (U.S. Bureau of Mines, Oct. 1993, Executive Summary, p. 4). When the U.S. Bureau of Mines asked which deposits were the most important non-operating deposits in the Desert Tortoise Priority Habitat (DTPH; Categories I & II), it was found that the commodities with the most value include borate, decorative stone, and gold, and collectively accounting for 87 percent of the total in place value (Almquist, et al., 1993, p. 4). The expected value for undiscovered mineral deposits, at 1992 prices and technology, is over $2 billion (U.S. Bureau of Mines, Executive Summary, Oct. 1993. p. 5; Almquist, et al, 1993, p. 15).

Tables 3-46 and 3-47 show acres of moderate and high mineral potential and percentage of those areas having mineral potential.

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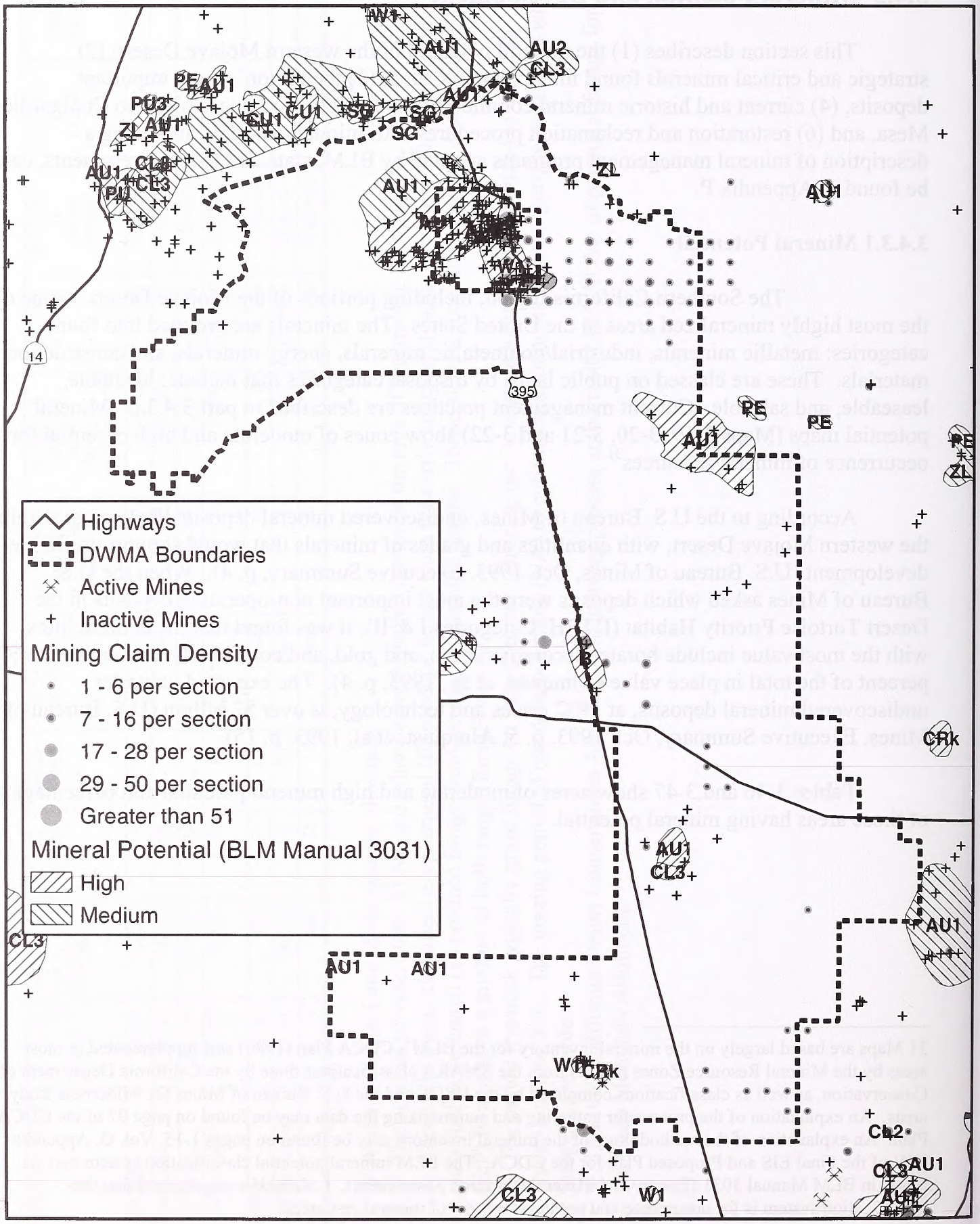
31 Maps are based largely on the mineral inventory for the BLM's CDCA Plan (1980) and supplemented in most areas by the Mineral Resource Zones (MRZ) from the SMARA classifications done by the California Department of Conservation, as well as classifications completed by the USGS and the U.S. Bureau of Mines for wilderness study areas. An explanation of the process for gathering and summarizing the data may be found on page 97 of the CDCA Plan. An explanation of the methodology of the mineral inventory may be found on pages 1-15, Vol. G, Appendix XIV of the Final EIS and Proposed Plan for the CDCA. The BLM mineral potential classification system may be found in BLM Manual 3031 (Energy and Mineral Resource Assessment). It should be emphasized that this classification system is for occurrence and not development of mineral resources.

Mineral Potential, Active and Inactive Mines, and Mining Claim Density - Fremont-Kramer DWMA



West Mojave Plan FEIR/S
Map 3-19

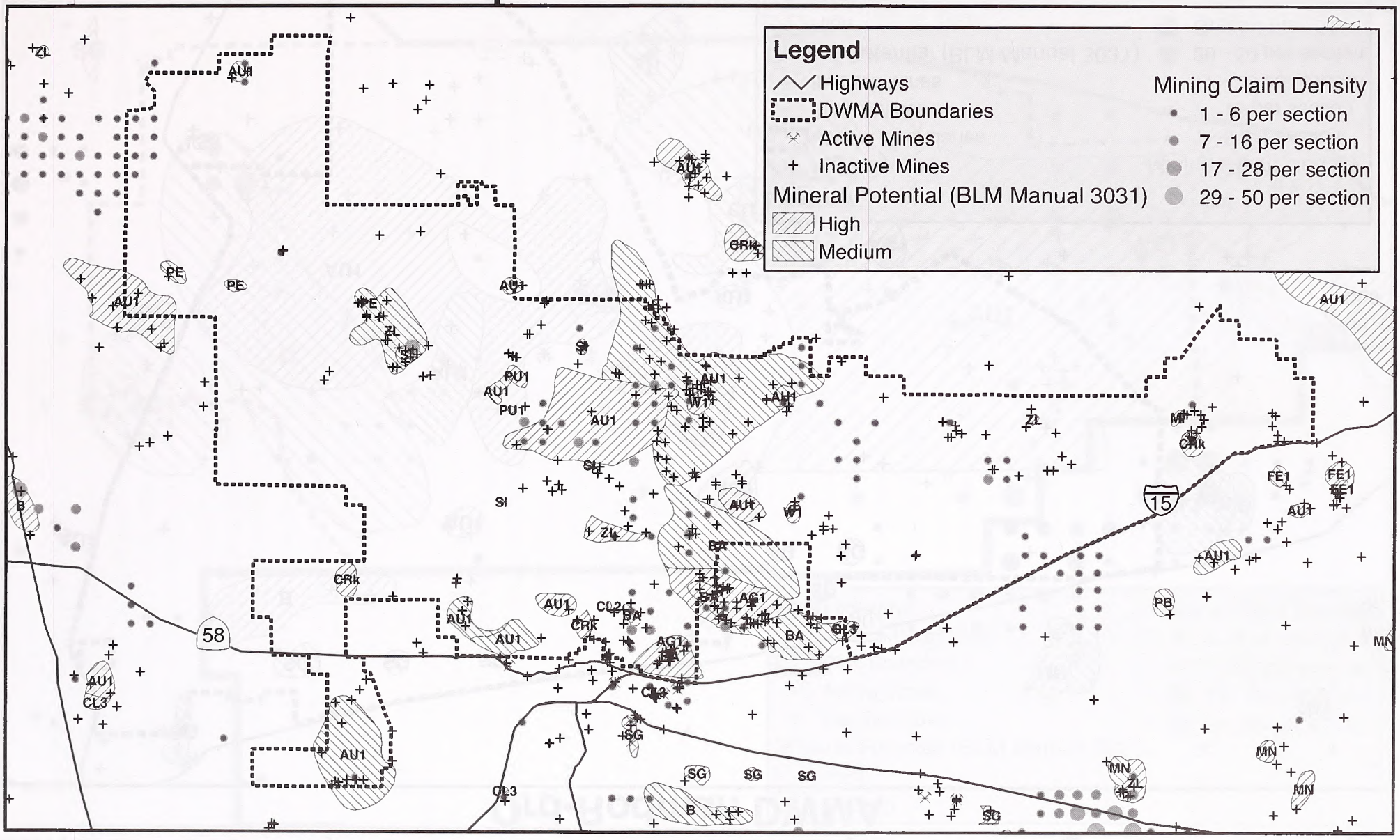
Scale: 1 : 450,000

0 10 20 Km

0 5 10 Miles

7/16/04

Mineral Potential, Active and Inactive Mines, and Mining Claim Density
Superior-Cronese DWMA



West Mojave Plan FEIR/S
Map 3-20

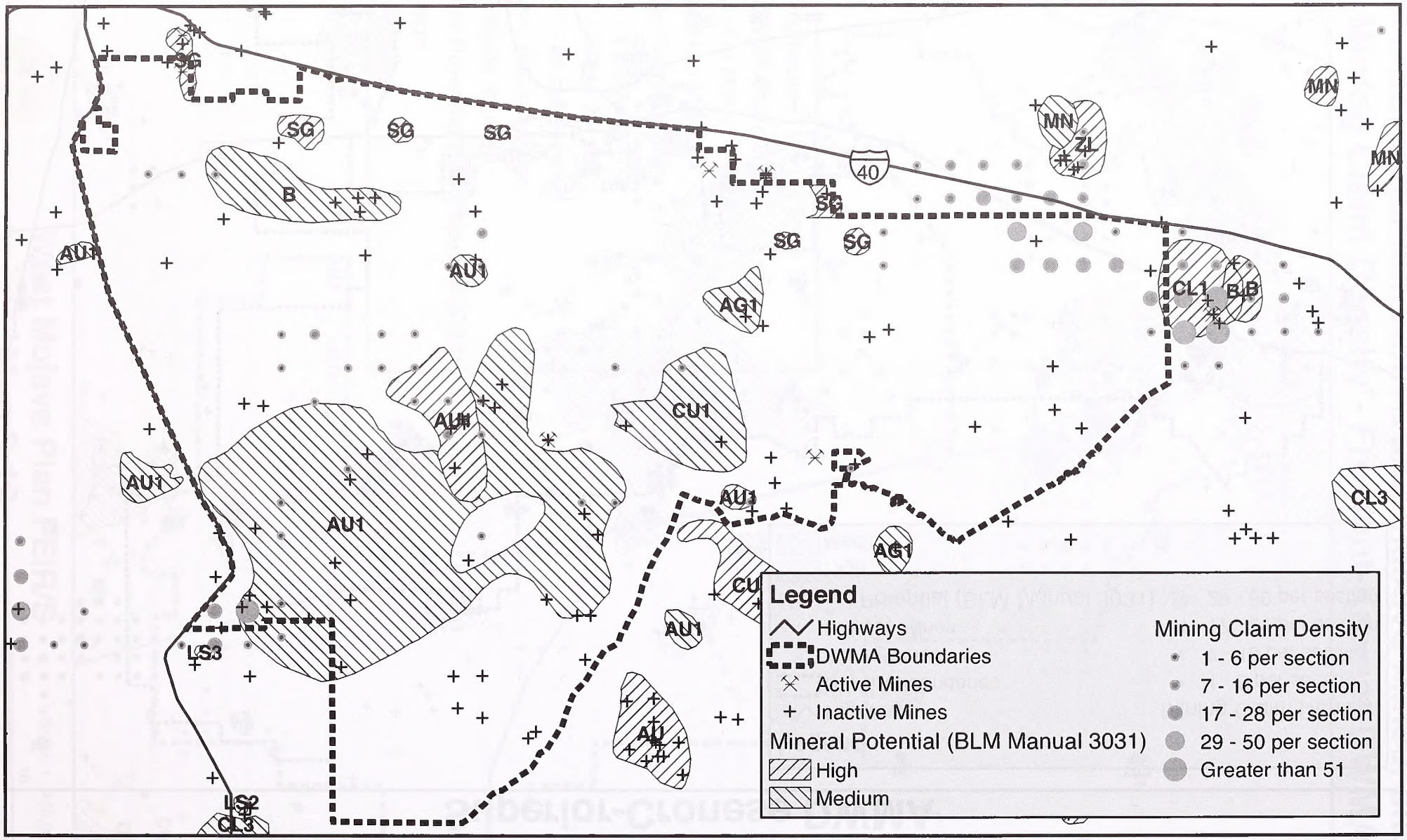
Scale: 1 : 500,000

0 10 20 Km

0 10 20 Miles

7/29/04

Mineral Potential, Active and Inactive Mines, and Mining Claim Density
Ord-Rodman DWMA



West Mojave Plan FEIR/S
Map 3-21

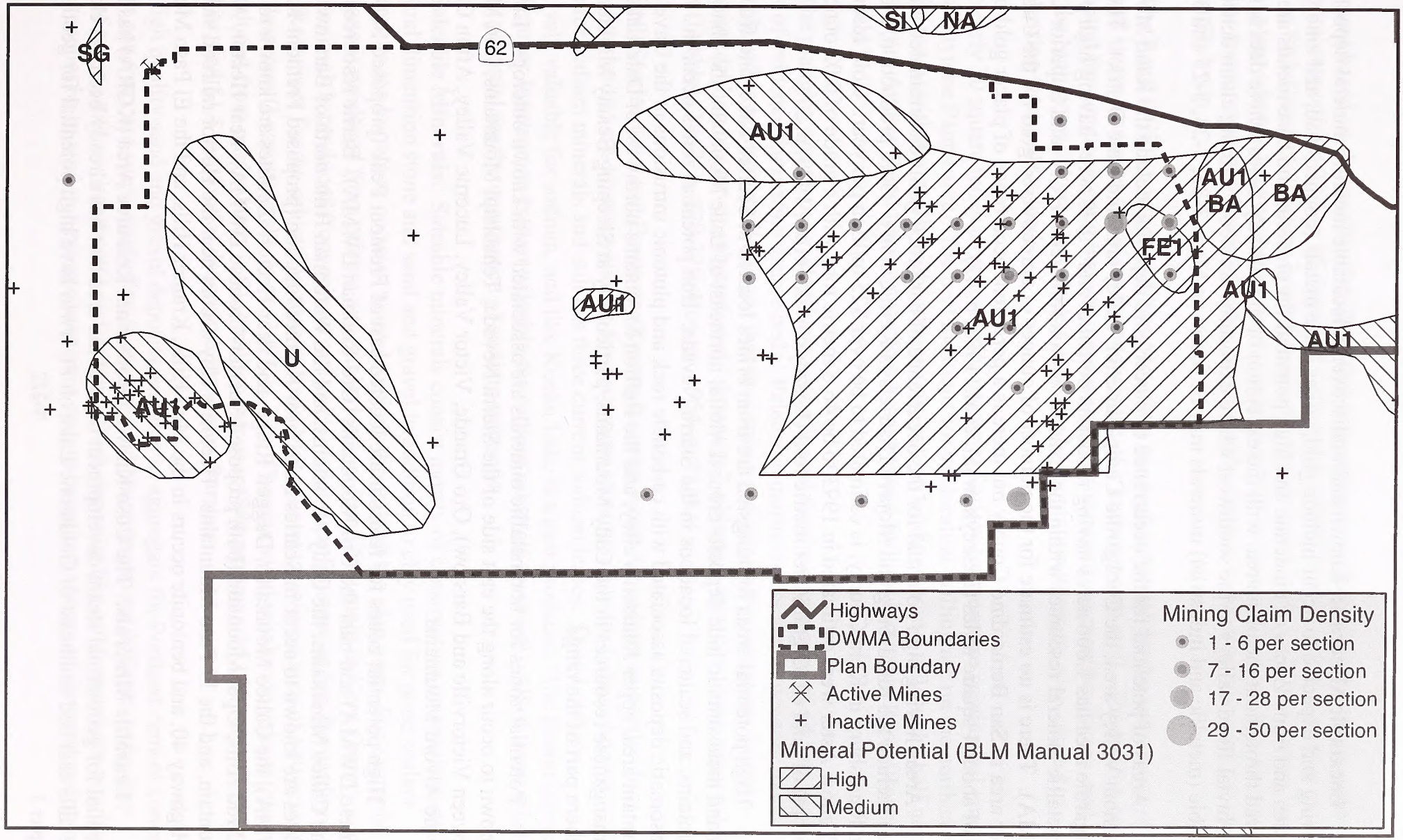
Scale: 1 : 280,000

0 10 20 Km

0 5 10 Miles

7/29/04

Mineral Potential, Active and Inactive Mines, and Mining Claim Density
Pinto DWMA



West Mojave Plan FEIR/S
Map 3-22

Scale: 1 : 180,000

0 5 10 Km

0 2.5 5 Miles

7/29/04

Locatable Minerals: Known and undiscovered locatable metallic mineral deposits occurring and expected to occur include gold, silver, base metals (copper, lead, and zinc), tungsten and iron. Zones of moderate and high potential for precious and base metals are scattered throughout the plan area, with the exception of the military bases where data is scarce, and alluvial filled valleys to the southwest where exposures are poor. Mining claim density for locatable (metallic and industrial) minerals may be found on Maps 3-23, 3-24, 3-25 and 3-26.

Areas of potential for the occurrence of placer gold deposits include the Rand Mountains – Fremont Valley area, the Coolgardie Camp-Superior Valley area and Dale District. The Coolgardie area has 1,806 acres having moderate potential and 9,890 acres having high potential for metallic mineral resources within the Lane Mountain milkvetch HCA (and Superior-Cronese DWMA). There is no estimate for the number of ounces of unrecovered gold for the Coolgardie placer area in San Bernardino County but there is a persistent occurrence of placer gold over an area of about 4 square miles (Leszcykowski, et al., 1993, p. 43).

Areas having high potential for the occurrence of hard rock gold (disseminated and in veins) include the Randsburg and Mojave Districts in Kern County. Gold production, mostly from Randsburg in Kern County, is estimated to be over $25 million per year. Gold reserves at the Yellow Aster were estimated in 1993 to be 46.8 metric tons with a grade of 0.02 ounces per ton (opt) of gold (0.63 grams per metric ton) (Leszcykowski, et al., 1993, p. 37).

High potential areas for tungsten are from brines located at Searles Lake, and from quartz vein and metasomatic lode deposits around Atolia, northeast of Lane Mountain, the Shadow Mountains, and scattered locations in the Sierra Nevada. Iron potential zones occur in metasomatic deposits associated with carbonate rock and plutonic intrusions in the Cave Mountain area, upper Johnson Valley, and the Bullion Mountains northwest of Dale Lake. There are manganese resources in the Cady Mountains, particularly at Sleeping Beauty Mountain in the southern part of the range.

Potential zones for nonmetallic minerals are associated with known outcrops. Limestone is known to occur along the east side of the Sierra Nevada, Tehachapi Mountains, Iron Mountain (between Victorville and Barstow), Oro Grande, Victor Valley, Lucerne Valley, Afton Canyon, and the Alvord Mountains.

High potential zones for feldspar are located east of Fremont Peak (proposed Superior-Cronese DWMA) and near the Ord Mountains (Ord-Rodman DWMA). Barite resources occur in the Calico Mountains, the Cady Mountains, and the Waterman Hills north of Barstow. Borates are known to occur in Searles Lake, near Kramer Junction (proposed Fremont-Kramer DWMA), the Calico Mountains, Daggett Ridge, and near Hector. Zeolites are known to occur in the Mud Hills, Opal Mountain (both proposed Suerior-Cronese DWMA), near Hector, Alvord Mountain, and the El Paso Mountains. Hectorite clay occurs near the Hector railroad siding off of Highway 40, and bentonite occurs in the Mud Hills, Kramer Hills, and the El Paso Mountains.

Leasable Minerals: The Coso Known Geothermal Resource Area (KGRA) has high potential for geothermal steam development beyond the area that has already been developed. The hills east and southeast of Goldstone Lake on Ft. Irwin have high potential for geothermal

development based on the results of drilling five temperature-gradient holes in which water temperature ranges from 78.5 to 85 degrees F. at a depth of 500 feet. A 5,000-foot hole is planned in Pink Canyon. If steam is not found at depth, the hot water could be used in a binary electrical plant where a heat exchanger with a working fluid such as freon is used to run a turbine with lower temperature geothermal fluids. Alternatively, the hot water could be used for space heating at Ft. Irwin.

The Rand KGRA northeast of Red Mountain has high potential for the occurrence of geothermal steam resources based on the occurrence of a known steam well. The KGRA has low potential for development, however, because of the distance from populated areas, and because the high potential area is included in the Red Mountain wilderness area, closed to mineral leasing from public lands.

Nearly 30 square miles have moderate potential for low temperature geothermal energy in the Twentynine Palms area. The best locations for exploration drilling are on the northeast side of the town, within a nearly eight-square-mile area extending about a mile and a half north and south from Amboy Road from Adobe Road east beyond Bullion Mountain Road (Rogers, 1987, p. B1).

The planning area is deemed to have low potential for the occurrence of oil and gas based on a lack of evidence for marine source beds. Paleozoic marine rocks are, in general, too metamorphosed to retain any oil and gas that they may have originally contained. Further confirmation drilling has never substantiated "showings", although they have been reported on drill logs (Dibblee, 1967, p. 128-129; Bowen, 1954, p. 181).

Both Searles Lake and Boron are Known Leasing Areas for sodium minerals. In addition, Searles Lake is known valuable for potassium minerals. Koehn Lake is known valuable for sodium minerals and still has three current sodium leases. Dale Lake is prospectively valuable for sodium, and like Koehn Lake is a past producer. The Boron deposit, west of Kramer Junction, is known valuable for sodium minerals (borates). All of these areas have high potential for the occurrence of sodium minerals.

Saleable Minerals: Saleable minerals consist mostly of construction materials such as crushed and dimension stone and sand and gravel in addition to clay used for pond sealant. These deposits are known to occur in many locations throughout the plan area. For example, veneer stone is produced from private and public lands at Rand Mountain in Kern County and landscaping rock is produced from private and public lands near Barstow in San Bernardino County. Resources for the schist flagstone at Rand Mountain exist over an area of 640 acres (2.6 square kilometers (Leszcykowski, et al., 1993, p. 39). The estimated wholesale value of the stone produced from public lands is $1.2 million per year ($80 per ton x 15,000 tons) for the Rand schist, and $1.5 million for decorative stone near Barstow.

High quality sand and gravel deposits, suitable as aggregate for Portland cement concrete or asphalt concrete, are surprisingly few in number and becoming more difficult to develop because of zoning and environmental restrictions. Such deposits, like gold, are where you find them and cannot be moved to a more convenient spot to be mined. Many of the sand and gravel

potential areas are actually borrow deposits, suitable for fill, road repair work or subbase. By necessity, these must be located near roads and highways. Local sources of aggregate are critical to lowering construction costs. The average cost of a ton of aggregate will double if it is hauled 35 miles (Beeby et al., 1999).

Common clays occur in the playas and Tertiary-age sedimentary rocks. Whether these deposits have potential for development depends on the proximity to markets and conflicts with other resources.

The El Paso Mountains are particularly favorable for the occurrence of pumice and pumicite.

3.4.3.2 Strategic and Critical Minerals

Strategic and critical materials are materials that (1) would be needed to supply the military, industrial, and essential civilian needs of the United States during a national defense emergency, and (2) are not found or produced in the United States in sufficient quantities to meet such needs (U.S. Bureau of Mines, 1983, p. 1). A strategic and Critical Materials Report to the Congress is submitted annually by the Department of Defense. The report details the operations of the National Defense Stockpile (NDS) and includes tables of the subject metals, minerals and materials. Among the 33 items on Table 5 (Stockpile Goals and Inventory Status) are manganese ore, tungsten ore, lead, silver and zinc, which occur in the planning area.

Three zones in the Cady Mountains have high potential for the occurrence of manganese resources, and several hundred tons of ore were produced during the first and second world wars (Wright et al., 1953, p. 114-117). Manganese is used for hardening steel and the United States has an import reliance of 100 percent, with most coming from Gabon, Brazil, and Australia.

Tungsten resources occur at Atolia and Searles Lake. As previously mentioned, up until 1938, Atolia was the principal source of tungsten ore in the state. Tungsten is used in high-temperature structural materials and electrical elements, and the United States import reliance is 68 percent, with most coming from China.

Table 3-46
Potential for Metallic, Industrial and Construction Minerals For Each Conservation Area

MANAGEMENT AREA	METALLIC MINERALS		INDUSTRIAL MINERALS		CONSTRUCTION MATERIALS			
	High Potential	Moderate Potential	High Potential	Moderate Potential	High Potential	Moderate Potential	Total High Potential	Total Moderat Potential
Superior-Cronese DWMA	30,760	45,563	18,896	36,843	1,397		51,053	82,406
Newberry-Rodman DWMA	4,581	44,275	4,798	14,479	1,398		10,777	58,754
Pinto Mountains DWMA	29,888	20,463		43			29,888	20,506
Fremont-Kramer DWMA	18,419	10,119	3,051	649	2,805	108	24,275	10,876
Mojave Ground Squirrel Conservation Area	65,442	131,648	3,574	25,979	13,778	23,597	82,794	181,224
Carbonate Endemics			177	4,416	80		257	4,416
Alkali Mariposa Lily			1,691				1,691	
Barstow Wooly Sunflower								
Bendries Thrasher	2,186	7					2,186	7
Big Rock Creek					2,404		2,404	
Lane Mtn Milkvetch	9,890	1,705					9,890	1,705
Little San Bern Mtns Gilia								
Middle Knob								
Mojave Fringe-toed Lizard	124		1,430	171	0		1,554	171
Mojave Monkeyflower Newberry	17	426	0	0	1,168	0	1,185	426
Mojave Monkeyflower Brisbane	5,338	549	651	0	730	0	6,719	549
Mojave Monkeyflower Kelso								
North Edwards				30				30
Pisgah Crater			8,817				8,817	
Total Acres								

Table 3-47
Percentage of Each Conservation Area Having High and Moderate Mineral Potential

MANAGEMENT AREA	MANAGEMENT AREA ACRES				ACRES			
	BLM Managed	Pivate and State Managed	Other Federal Managed	Total Management Area	Total High Potential	Percent of Management Area	Total Moderate Potential	Percent of Management Area
Superior-Cronese DWMA	402,962	209,979	9,646	622,587	51,053	8%	82,406	13%
Newberry-Rodman DWMA	195,046	48,440	54	243,540	10,777	4%	58,754	24%
Pinto Mountains DWMA	109,090	7,240	655	116,985	29,888	26%	20,506	18%
Fremont-Kramer DWMA	320,468	190,389	4	510,861	24,275	5%	10,876	2%
Mojave Ground Squirrel Conservation Area	669,352	86,612	1,790	757754	82,794	11%	181,224	24%
Carbonate Endemics	4,393	762	10	5,165	257	5%	4,416	85%
Alkali Mariposa Lily	67,330	15		67,345	1,691	4%		
Barstow Wooly Sunflower	18,327	17,884		36,211				
Bendries Thrasher	9,363	16,390	98,126	123,879	2,186	2%	7	<1%
Big Rock Creek		10,746	38	10,784	2,404	22%		
Lane Mtn Milkvetch	12,100	4,975		17,075	9,890	58%	1,705	10%
Little San Bern Mtns Gilia	2,863	22,511	7	25,381				
Middle Knob	17,671	2,802		20,473				
Mojave Fringe-toed Lizard	21,767	902	1556	24,225	1,554	6%	171	1%
Mojave Monkeyflower Newberry	25,997	10,427	7	36,431	1,185	4%	426	1%
Mojave Monkeyflower Brisbane	10,447	207		10,654	6,719	63%	549	5%
Mojave Monkeyflower Kelso								
North Edwards	1,140	13,198	5	14,343			30	<1%
Pisgah	17,439	4,678	42	22,159	8,817	40%		

A third item, yttrium (on the USBM list but not the NDS list) occurs as undeveloped resources in the southern part of the planning area. Similar to the "rare earth" elements, yttrium is found in the mineral xenotime in Music Valley at the edge of the Pinto Mountains in Riverside County. In 1998 Draco Exploration identified 330,000 short tons of resources containing over 700,000 pounds of Yttrium oxide and nearly 1.2 million pounds of additional rare-earth oxides (Moyle & Cather, 1992, p. 57). The United States imports 100 percent of its yttrium, with most coming from China. There are no satisfactory substitutes for yttrium regarding its use in electronics, lasers and phosphors in color television and computer monitors (Hedrick, 2002, p. 186-187).

Although celestite (along with kyanite, mica and talc), has been determined to be "neither strategic nor critical" in the Stockpile Report to Congress for fiscal year 2001 (DOD, p. 55), celestite (an ore of strontium) has been on the stockpile inventory in years past. About 100 acres in the planning area have high potential for the occurrence of strontium resources, and several thousand tons of celestite were mined during both world wars from the southern edge of the Cady Mountains. By far the largest deposits of strontium minerals in California occur in the foothills of the Cady Mountains (Ver Planck, 1957, p. 607). Strontium is used for ceramics, ceramic magnets, and glass, particularly television plate glass because of its ability to block X-rays. It also produces the red flame in pyrotechnics, including ammunition tracers and flares. The United States import reliance on strontium is 100 percent.

A 1992 study by the U.S. Geological Survey estimated the occurrence of the critical metals lead, silver and zinc in the planning area. The report included a figure showing the probability distributions for each metal in all of the undiscovered deposits that were evaluated. Figures in metric tons were plotted against probability of occurrence ranging from zero to one. At a probability of 0.5, the estimated number of metric tons in the study area was predicted to be 200 tonnes of lead, 300 tonnes of silver and 7 tonnes of zinc (Tosdal, et al., Dec. 1992, p. 78). Silver is often produced as a byproduct from gold mining. Gold is being mined at Randsburg and has been recently mined in the Mojave gold mining district.

3.4.3.3 Identified Resources by Commodity

Within the planning area there are approximately 426,000 acres having moderate to high potential for the occurrence and accumulation of metallic mineral resources, 126,000 acres having potential for the occurrence of industrial minerals, and 47,700 acres having potential for the occurrence of construction materials. In addition, there are nearly 13,000 acres having moderate to high potential for the accumulation of sodium and potassium minerals. There are approximately 119,000 acres classified as Known Geothermal Resource Areas and 480,000 acres classified as prospectively valuable for geothermal resources (BLM Manual 3031). Within the plan area there are about ten active mines in critical habitat for the desert tortoise.

There are twelve sites near Barstow in San Bernardino County with important resources amounting to 16 million tons (Almquist, et al., 1993, p. 4) for landscaping rock (10 crushed stone & two flagstone): black granite, pink granite, beige, Afton green rock (3 quarries), mint green, pink volcanic rock, dusty rose and wine. Flagstone is mined from two sites in the Rand Mountains. These figures do not include the brown or "gold" colored rock east of Barstow

because the study was done before that site was known to be habitat for the desert tortoise.

Identified resources for selected producing deposits are discussed above, and non-producing deposits are presented below beginning with gold.

The Kramer Hills gold deposit on private land has identified resources reported to be 2.0 million metric tons (2.2 short tons) averaging 1.3 grams per ton (0.004 ounces per ton) gold and inferred resources of about 2.7 million metric tons (3 million short tons). Metal resources are about 2,600 kilograms (5,700 pounds) of contained gold (Lewszcykowski, et al., 1993, p. 52).

The Olympus mine in San Bernardino County has moderate potential for the occurrence of vein gold deposits with 1.8 million tons of resources containing 0.11 to 0.22 opt (3.4 to 6.8 grams of gold per metric ton).

The disseminated deposits in the Calico district contain the largest resources of silver in the study area with the Waterloo and Langtry deposits near Barstow containing 27 million tons (24.5 million metric tons) averaging 105 grams per ton (3 opt) silver and 11.8 percent barite and 15 million tons (13.6 million metric tons) averaging 85 grams per ton (2.5 ounces per ton) and 6.0 percent barite respectively (Fletcher, 1986; Tosdal, et al., March 1992, p. 8). Over 4,000 acres in the Calico Mountains have been classified under SMARA as MRZ-2b (moderate potential for occurrence) for silver and barite resources by the California Department of Conservation (Bezore et al., 1997, p. 37).

Over 500 acres on the south slope of Ord Mountain (Ord-Rodman DWMA) has been classified under SMARA as MRZ-2b (moderate potential for occurrence) for copper and molybdenum resources by the California Department of Conservation (Bezore et al., 1997, p. 24). Sulfide resources are estimated to be 2,600,000 tons (0.26% copper & 0.12% molybdenum), and combined oxide resources are estimated to be 489,000 tons (0.4% copper & 0.07% molybdenum).

The most important borate resources outside of the active mining area at Boron are the Rho and 395 Hill colemanite deposits northwest of Kramer Junction in San Bernardino County. The Rho deposits contain an estimated total of 86 million metric tons (95 million short tons) of material averaging 5 percent to 17 percent B_2O_3, and the 395 Hill contains an unknown quantity of colemanite-bearing shale with abut 3.7 percent B_2O_3 (Leszcykowski, et al., 1993, p. 47 & 48).

The Alvord Mountain limestone deposit has identified resources of 20 million short tons (18 million metric tons) of high-grade whiting limestone and an accompanying 20 million short tons of cement grade limestone inside a window surrounded by tortoise habitat (Leszcykowski, et al., 1993, p. 45).

In 1993 the Calspar feldspar deposit (Ord-Rodman DWMA) contained "a proven ore reserve of 150,000 short tons (136,000 metric tons) of milling grade rock..." (Leszcykowski, et al., 1993, p. 57; Randol Mining Directory, 1990, p. 114.) The feldspar occurs in two zones of roughly 60 acres and 115 acres on either side of Camp Rock Road and has been classified under SMARA as MRZ-2a and MRZ-2b, respectively (high and moderate potential for occurrence) by

the California Department of Conservation (Bezore *et al.*, 1997, p. 36 -37).

The Mud Hills zeolite deposit north of Barstow contains resources of at least 207,000 tons (188,000 metric tons; Leszcykowski, et al., 1993, p. 52). The Opal Mountain zeolitic tuff has an estimated resource of 2 million tons (1.8 million metric tons) (Leszcykowski, et al., 1993, p. 41 & 44), and the Alvord Mountain zeolite deposit has resources estimated in the range of 276,000 tons (250,000 metric tons).

Chemical analysis of water from wells at Kohen Lake in Kern County indicate the water contains sodium at 0.6 percent to 3.6 percent (6,000 to 36,000 milligrams per liter), chloride at 0.9 percent to 5.6 percent (9,000 to 56,000 milligrams per liter), and sulfate at 0.5 percent to 5.4 percent (1,500 to 5,400 milligrams per liter). Sodium chloride or salt is a leasable mineral and has potential use for specialized agricultural products (Leszcykowski, et al., 1993, p. 36).

Important resources of sand and gravel occur northwest of Afton Canyon and in the Soda Mountains, southwest of Baker in San Bernardino County. The deposit in the Cronese Mountains, northwest of Afton Canyon, is one of two identified by Caltrans as a suitable source of aggregate along Interstate 15 between Barstow and the Nevada state line. It contains an estimated 6.8 million metric tons (7.5 million short tons) of sand and gravel (Leszcykowski, *et al.*, 1993, p. A-99). The second deposit, known as Opah Ditch, contains an estimated 3 million short tons of sand and gravel between the Soda Mountains Wilderness Study Area (WSA) and the utility corridor. A similar quantity probably occurs within the WSA. The Blackhawk landslide, between Highway 247 and the San Bernardino Mountains, contains an estimated 400 to 500 million tons of naturally crushed dolomitic limestone which is potentially suitable for aggregate, road-base, railroad ballast, concrete rock and sand (Fife, 1982, p. 483). The Big Rock Creek fan in Los Angeles County contains 2,400 acres having high potential for the occurrence of sand and gravel. Present extraction is occurring on the nearby Little Rock Creek fan.

Future production is expected to be concentrated in the categories of gold (especially with a price increase), aggregate (particularly along I-15), and nonmetallic minerals, including borates specialty clays and limestone (calcite marble and dolomite). Only minor activity is anticipated in lead-zinc-silver deposits due to the small vein type deposit models exhibited by these metals, high operating costs to mine and recover these minerals, and depressed commodity prices.

3.4.3.4 Current and Historic Mineral Commodity Production

Overview: Mining in the California Desert can be traced back to the early nineteenth century, when silver and gold were mined along the Colorado River prior to the Sutter's Mill gold discovery in northern California in 1848. Since that time, 19 different metallic and 27 non-metallic mineral commodities have been extracted from the desert (Bureau of Land Management, 1980, p. 96). Mineral commodities mined currently or in the recent past include metallic minerals such as: gold, silver, lead, zinc, silver tungsten and iron; industrial minerals such as barite, boron, hectorite, bentonite, zeolites, gypsum, sodium, and calcium salts and compounds, potash, and limestone; materials necessary for transportation and construction such as sand and gravel, crushed rock, lightweight aggregate (pumice and cinders), dimension stone;

and minerals of intrinsic and scientific value such as turquoise, opal, jasper, and specimen materials. Construction aggregate is the highest tonnage and highest dollar-value commodity produced in California. In 2000, 240 million tons of construction sand and gravel and crushed stone were produced with a dollar value of 1.4 billion dollars (Kohler, 2000, p.7.3).

Annual mine revenue from production from existing mines in the western Mojave Desert, for Category I and II tortoise habitat alone, is estimated to be $22.2 million, accumulating to 248.6 million over the lives of the mines (U.S. Bureau of Mines, Executive Summary, Oct. 1993, p. 4; Almquist, et al., Oct. 1993, p. 7). Prospecting for gold continues throughout the planning area and production is occurring at Randsburg. Inactive small mines and prospects are scattered throughout the planning area. A few select commodities of particularly significance are presented below.

Table 3-48, showing known active mines in each conservation area, lists eight active mines (i.e. a mine with a SMARA plan) in proposed tortoise DWMAs and eight active mines in the MGS Conservation Areas. In addition there is an aggregate operation in the carbonate endemic management area downslope from the Mitsubishi plant with plans to begin production after a rail spur can be acquired.

Table 3-48
Active Mines Within Conservation Areas

CONSERVATION AREA	ACTIVE MINES	
	BLM Managed	Private And State Managed
Superior-Cronese DWMA	Beige stone, Afton green stone, Mud Hills zeolite, Opal Mountain zeolite	
Newberry-Rodman DWMA	Redtop cinders	
Pinto Mountains DWMA		
Fremont-Kramer DWMA	Rand Mountain stone	Rand Mountain stone, Shadow Mountains dolomite
Mohave Ground Squirrel	Coso Mountains pumice, Trona sand and gravel, Trona clay, Back Springs bentonite, Mud Hills zeolite, Opal Mountain zeolite	Rand Mountain stone, Shadow Mountains dolomite
Carbonate Endemics		
Alkali Mariposa Lily		
Barstow Woolly Sunflower		
Bendire's Thrasher		
Big Rock Creek		
Lane Mountain Milkvetch	Coolgardie gold	
Little San Bernardino Mountains Gilia		
Middle Knob		
Mojave Fringe-toed Lizard		Hectorite, borate, cinders
Mojave Monkeyflower – Newberry		
Mojave Monkeyflower – Brisbane		
Kelso Valley Monkeyflower		
North Edwards		Boron clay

Table 3-49 shows the number of mining claims and sites within each conservation area. There are approximately 110 active notices and 55 plans of operations within the planning area boundary.

Table 3- 49
Mining Claims and Sites Within Management Areas

MANAGEMENT AREA	MINING CLAIMS AND SITES			
	LODE	PLACER	MILL SITE	TUNNEL SITE
Superior-Cronese DWMA	73	169	21	0
Newberry-Rodman DWMA	163	53	0	0
Pinto Mountains DWMA	67	40	0	0
Fremont-Kramer DWMA	63	268	0	0
Mojave Ground Squirrel Conservation Area	146	534	40	0
Carbonate Endemic Plants Research Natural Areas	11	40	0	0
Alkali Mariposa Lily Conservation Area	0	0	0	0
Barstow Woolly Sunflower Conservation Area	28	0	0	0
Bendire's Thrasher Conservation Area	0	0	0	0
Big Rock Creek Conservation Area	0	0	0	0
Lane Mountain Milkvetch Conservation Areas	0	22	0	0
Little San Bernardino Mtns Gilia Conservation Area	0	0	0	0
Middle Knob Conservation Area	0	0	0	0
Mojave Fringe-toed Lizard Conservation Area	0	11	0	0
Mojave Monkeyflower Conservation Area	40	27	2	0
North Edwards Conservation Area	0	0	0	0
Pisgah Conservation Area	230	65	85	0
Total Mining Claims and Sites in MA's:	821	1,230	149	0
Total Mining Claims and Sites in the Planning Area:	1,577	1,604	268	0

Numbers reflect the November 2001 43 CFR 3833 recordation database maintained by BLM. Locations are to the nearest ¼ section. Numbers are by management area and do not differentiate those mining claims lying within two or more management area overlaps.

Saline Deposits: The most important nonmetallic commodities found in the California desert region are borate and associated evaporite minerals and saline brines, collectively known as saline deposits (Dellinger, 1989, p.57).

One of the most outstanding discoveries took place in 1863 when J.W. Searles found borax near present day Searles Lake at Trona, in San Bernardino County. Production of borax, and 14 other associated minerals, from the brines of Searles Lake continue to this day. Searles Lake is an in-situ solution mine administered under the solid leasable mineral regulations at 43 CFR 3500. It has a current mine and reclamation plan approved by the BLM and State Mine and Reclamation Act (SMARA). Mining is conducted on thirty Federal mineral leases (consisting of twenty two sodium leases and eight potassium leases) and one sodium permit aggregating 25,662 acres of BLM-administered public lands. There are 6,647 acres of private lands included within the mining area. The Trona, Argus and Westend Plants are located on private lands adjacent to the mining area. Mining began at Searles Lake in the early 1900s and is expected to continue for many years due to its location at the end of a chain of Pleistocene lakes where rich mineral

deposition occurred. Brines are pumped from the playa lakebed to the plants where desired minerals are removed, then the brine is returned to the lakebed. Annual production from the mine is about 1,400,000 tons of soda ash, 130,000 tons of borates, 43,000 tons of boric acid, 220,000 tons of sodium sulfate and 42,000 tons of salt. These products are used for glass, detergents, water treatment, petroleum refining, circuit boards, ceramics, insulation and paper manufacturing.

Production of borax and other sodium minerals in the California desert is of national and local significance. About 97 percent of the United States production and 43 percent of the world production of borax comes from Searles Lake at Trona, and U.S. Borax at Boron. The California Desert produces over $500 million worth of borate minerals per year (Kohler, 2002, p. 49). The mine at Searles Lake has over 700 employees with additional contractors, consultants and services. It is the largest employer in Trona and the second largest employer for Ridgecrest. The Federal sodium and potassium mineral leases generate over $3 million Federal mineral royalties each year, half of which go into the Federal general treasury and half of which are returned to the State of California for the direct benefit of local public education.

Another significant find was the borax deposit at Boron, in Kern County, discovered accidentally in a water well drilled in 1926, and mined continuously since 1927. The U. S. Borax Company mines approximately 9,000 tons of ore daily (Siefke, 1991, p. 6.) and 1,100 men and women are employed at the Boron facility (Lyday, 2001, p. 13.2). Borates have many uses including the manufacture of high quality glass, fiberglass and chemicals.

The world's largest hectorite mine occurs south of the Cady Mountains in the West Mojave Desert Planning Area. Hectorite is a specialty clay used in high quality paints, pharmaceuticals, cosmetics, and personal care products.

In the Calico Mountains, near Barstow, about $9 million worth of borate minerals were produced from 1884 to 1907. Over 15 million ounces of silver were mined from the Calico Mountains from 1881 to 1890.

Gold: The western Mojave Desert has been an important source of gold production. Beginning in 1893, mineral production from the Randsburg district was nearly 1 million troy ounces of gold and 18 million troy ounces of silver. In addition, more than one million short ton units (10,000 tons) of tungsten trioxide were mined from the Atolia district form 1904 to the 1950s. Gold production up to 1970 was over $20 million (Clark, 1970, p.167). Current gold production from the district is estimated to be 80,000 ounces per year. Between 1890 and 1942, 185,000 troy ounces (5.8 metric tons) of gold was produced from the Dale District, which occurs in both Riverside and San Bernardino Counties (Tosdal, et al., 1992).

Up until 1938, Atolia was the principal source of tungsten ore annually in the state, and production amounted to over 8,000 metric tons of tungsten (Tosdal, et al., 1992, p. 49).

Iron: Iron was produced from the Cave Mountain (Baxter) and Bessemer mines as well as from numerous small deposits in San Bernardino County as early as 1930. The Cave Mountain mine has been active for a number of years. California Portland Cement Company

produces about 75,000 tons per year from the mine for use as a flux for making cement (Brown & Monroe, 2000, p. 45).

Limestone: Limestone mining in the Victor Valley area began in 1910 at Oro Grande by Golden State Portland Cement Company (currently owned by TXI) (Taylor, 1994, p. 33). This was followed in 1914 by the Black Mountain quarry operated by Southwest Portland Cement Company (currently owned by Cemex). Their Victorville cement plant has recently completed a 1-million short ton per year plant expansion (Kohler, 2002, p.50).

The capacity of California Portland Cement's Creal plant was 1.3 million tons per year in the early 1990s. Located 9 miles west of Mojave and well outside of any HCAs, the plant is the fourth largest in California (PCA, 1997).

Lucerne Valley is one of the largest limestone producing districts in the United States and is the leading producer of white, high-purity calcium-carbonate products in western North America. In 1987 the district had an estimated gross value in excess of $80 million (Brown, 1987, p. 52). Annual production is about 1.7 million tons of Portland cement and about 1.5 million tons of ground calcium carbonate (Economic & Planning Systems, Inc., 2002, p. 29 & 31). Ground calcium carbonate is used principally for joint cement, carpet backings, asphalt roofing, paint, plastics, paper, rubber, plastics, and even chemical grade for food-and pharmaceutical-grade products (Economic & Planning Systems, Inc., 2002, p. 30). Production is from mostly private land just south of the planning area boundary.

The first commercial white limestone-dolomite operations in north Lucerne Valley began in the 1940's at Peterman Hill (Fife, 1988, p. 175). The Cushenbury limestone quarry was opened in 1947, and operated intermittently and on a small scale until it was shut down in 1950 (Taylor, 1994, p. 33). From 1953 to 1957 Kaiser Steel (currently owned by Mitsubishi Cement Corporation) brought a railhead to Lucerne Valley to construct the first cement plant and to open the first large limestone quarry in Cushenbury Canyon (Fife, 1988, p. 176). This cement plant is reported to be the largest in California. In the early 1960's, Chas Pfizer Mineral and Pigments Division (now Specialty Minerals) acquired deposits in Furnace and Marble canyon area in the San Bernardino Mountains. From the mid 1960s to about 1994 Partin produced limestone from its Terrace Springs operation on Forest Service land east of Blackhawk Mountain. The limestone was used for a white pigment filler-extender used extensively in white stucco and swimming pool construction (Gray, 1982, p. 217). Since 1980, the Marble Canyon deposit has been mined continuously (Taylor, 1994, p. 52). In the mid 1970's Pluess-Staufer (now OMYA) took over the limestone plant originally developed by Sentinel Mining in the upper Crystal Creek drainage (Fife, 1986, p.36). At the White Knob quarry the Bullion Member of the Monte Cristo Limestone yields exceedingly coarse-grained, very white translucent calcite marble (Taylor, 1994, p. 53).

Geothermal: At Coso Basin, on China Lake NAWS, geothermal steam was recovered in 1981 and brought into production in 1987. Present production is about 76 megawatts (MW) per year, compared with about 195 megawatts for the CDCA, and 930 megawatts for the state. The Coso Geothermal Resource Area, located on both public lands administered by the BLM and withdrawn lands administered by China Lake NAWS, is one of the largest and hottest

geothermal fields in the Western United States. There are four production wells on BLM-managed land in addition to 10 production wells and two water injection wells on Navy administered land, three 25 MW power-plants under construction or completed, with four power-plants planned for the near future. Presently there are two producing leases covering 5,100 acres, and an additional lease of 2,555 acres is considered "held in production" on BLM-managed land. Since December 1988, the Minerals Management Service has collected approximately $50 million in royalty, with 50 percent going to the state.

Roughly 30,000 tons per year of pumice are produced from the Coso Mountains in Inyo County.

Aggregates: Sand and gravel and other aggregates are produced at a number of locations within the planning area from alluvial fans and other sedimentary deposits. Commercial deposits, however, are limited by transportation costs and, therefore, are usually located near market areas. These commodities are used primarily for ongoing major highway construction and repair and as aggregate for concrete in urban areas.

Service Rock Products (previously Owl) has produced sand and gravel from the Barstow pit on private land since the 1960s. The Crystal Creek drainage in Lucerne Valley has been mined for sand and gravel as early as the 1950s. The current operator is Hi-Grade Materials. The aggregate resources in this area have an average thickness of 225 feet based on mining in this area (Miller, 1993, p.39). Production in the Little Rock Creek deposit (near Palmdale and Lancaster) began in 1941 (Joseph et al., 1987, p.10) with several operators in production by the 1950s (Evans, et al, 1979, p.17). The pit in Twentynine Palms off of Mojave Road has been operating since the early 1950s by Hi-Desert Concrete Products, now owned by Granite Construction. Channel Basin & Reclamation is opening the Cushenbury pit in Lucerne Valley with a production capacity of a million tons per year (Heter, 2002). The Opah Ditch site, in the Soda Mountains southwest of Baker, has been used in the past and will undoubtedly furnish aggregate for paving jobs along Interstate 15 in San Bernardino County. About 10,000 tons per year of sand and gravel are produced from BLM lands in Inyo and Kern County. Crushed stone sales in the Barstow area for roofing and landscaping rock are estimated to range from 40,000 to 50,000 tons per year. Flagstone production from public land in Rand Mountain is estimated at around 15,000 tons per year.

A summary of the most important deposits in the planning area, listed by county, is presented in Table 3-50.

Table 3-50
Most Important Deposits By County
Ranked In Order Of Relative Contribution

COUNTY	COMMODITY	ESTIMATED ANNUAL PRODUCTION/ RESOURCES*	HCA N/A = OUT OF HCA
San Bernardino	Borates[1]	130,000 tons	N/A
	Sodium Minerals[2]	1,662,000 tons	N/A
	Portland Cement[3] (mostly limestone) (Victor Valley & Oro Grande)	4,500,000 tons	N/A
	Sand & Gravel[4]	9,800,000 tons	N/A
	Sand & Gravel[5]	Confidential	N/A
	Crushed Stone[6]	24,000 tons	Sup.-Cron, Fre.-Kramer
	Crushed Stone[7]	480,000 tons	N/A
	Hectorite clay	Confidential	N/A
Kern	Borates[8]	3,300,000 tons	N/A
	Gold[9]	80,000 ounces	N/A
	Portland Cement[10] (mostly limestone)	1,200,000 tons	N/A
	Flagstone (BLM)[11]	15,000 tons	Fremont-Kramer DWMA
Inyo	Geothermal[12]	76 megawatts	N/A
	Pumice[13]	30,000 tons	MGS
	Black Springs Clay[14]	2,500 tons	MGS
Los Angeles	Sand & Gravel[15]	13,000,000 tons	N/A
Riverside	Yttrium (undeveloped)[16]	*330,000 tons	Pinto Mtns. DWMA
	Additional rare-earth oxides (undeveloped)	*1.2 million tons: oxides	

[1]"Borates" from BLM leases at Searles Lake includes a variety of compounds and products such as borax & boric acid. Production figures from Kathleen Cox, BLM Geologist, Ridgecrest F.O. Production from the Ft. Cady project near Hector site is unknown.

[2]"Sodium Minerals" from BLM leases at Searles Lake includes sodium sulfate, soda ash and salt. Production figures from Kathleen Cox, BLM Geologist, Ridgecrest F.O.

[3]Production figure for Portland cement is a rough estimate based on estimates of the production capacity for the three plants on private land at Black Mountain, Victorville, and Oro Grande. The Mitsubishi plant is omitted because the mines are outside of the WEMO planning area.

[4]Production estimate for private lands in the district including Barstow, Victorville, Oro Grande and Lucerne Valley takes into account imports from Lytle Creek; source: Miller, R.B., 1994, Mineral land classification of concrete aggregate resources in the Barstow-Victorville area: California Geology, v. 47, no. 1, p. 8, published by Calif. Div. of Mines and Geology.

[5]Sand and gravel has been produced since about 1955 from a pit in Twentynine Palms originally owned by Hi-Desert Concrete Products and currently owned by Granite Construction.

[6]This figure is a rough estimate for production of decorative rock from three quarries near Lead Mountain (BLM, northeast of Barstow), Afton (BLM, nearly 40 miles northeast of Barstow), and the Shadow Mountains (patented, northwest of Adelanto).

[7]Production represents an estimate for the composite of four quarries for decorative stone near Barstow, a quarry off of Hodge road and southeast of I-15, and a larger quarry for railroad ballast in the Newberry Mountains (400,000 tons), all on private land.

[8]The production rate was converted to short tons from the stated 3,000,000 metric tons of raw ore per day from four zones mined by open pit on patented land at Boron (Lyday, P.A., 2001, Boron: U.S. Geological Survey, Minerals Yearbook 2001, p. 13.2). The amount of borate compounds produced was reported to be 570,000 metric tons, equivalent to 628,000 short tons for the year 2000.

[9]This gold production figure is a very rough estimate for the Rand mine (BLM land) furnished by Randy Porter, BLM Geologist, Ridgecrest F.O.

This estimate compares with a figure of 100,000 ounces for the year 2000 stated by the Glamis Rand Mining Co. on their web site: www.glamis.com.

[10]The production figure is based on a rough estimate for the production capacity of the Creal cement plant located on private land 9 miles west of Mojave. The California Portland Cement plant is owned by Taiheiyo Cement and is the fourth largest in California.

[11]Production figure for Rand Mountain schist (flagstone on BLM land) furnished by Randy Porter, BLM Geologist, Ridgecrest F.O.

[12]Production of 76 MW off of BLM leases: Sifford, A. & Bloomquist, R.G., 2000, Geothermal electric power production in the United States: a survey and update for 1995-1999, proceedings World Geothermal Congress 2000, Fig. 8, p. 448.

[13]Estimate of production from BLM land from Randy Porter, BLM Geologist, Ridgecrest F.O.

[14]Estimate of bentonite production is from George Diverse, BLM Geologist, Ridgecrest F.O. The bentonite is trucked 220 miles to Riverside County where it is used for making roofing tiles.

[15]Estimate of production from several companies operating in Little Rock Creek for 2002-2006 (mostly private land): Joseph, S.E. et al., 1987, Mineral land classification of the greater Los Angeles area, Calif. Div. of Mines and Geology, Special Report 143, Part V, p. 25.

[16]Estimate of resources on BLM land (no production): Moyle, R.R. and Cather, E.E., 1992, Mineral classification in the California Desert Conservation Area, Open File Report 62-92, prepared to illustrate the variety of potential impacts which could occur should the California Desert Act or similar legislation become law, U.S. Bureau of Mines, Western Field Operations Center, Spokane, WA, p. 57.

3.4.3.5 Coolgardie Mesa

The Coolgardie mining district, about 15 miles northwest of Barstow, is within the proposed Superior-Cronese tortoise DWMA and overlaps with the west portion of the proposed Lane Mountain Milkvetch Conservation Area. This part of the CDCA is managed for mining activity under Multiple Use Class L (limited). Gasoline or hand-powered dry washing or sluicing has been done intermittently in this area since 1900 and the total historical output was reported by Clarke (1970, p. 157) to be $100,000. The deposits are in a broad valley and the gold is found as mostly tiny particles in the upper few feet of alluvial cover.

Although the heaviest concentration of mining claims lies to the west, there are twenty-two mining claims within the Coolgardie Mesa portion of the proposed Lane Mountain Milkvetch Conservation Area (see Table 3-51):

Table 3-51
Lane Mountain Milkvetch Conservation Area Mining Claims

TOWNSHIP	RANGE	SECTION	CAMC NUMBER	CLAIM NAME
11N	01W	03	178797	Lane View
			264175	Sheepe-Sheepe
			274362	New Century I
			274363	New Century II
			274364	Millenium I
			274365	Millenium II
			274366	Millenium III
			274367	Millenium IV
12N	01W	31	065897	Rams Head #1
			065898	Rams Head #2
			065899	Rams Head #3
			065900	Rams Head #4
		32	279094	Malek F.L.P.
32S	46E	34	119639	Two Quartz #1
			119640	Two Quartz #2
			119641	Two Quartz #3
			270500	J ZERO 1
			272481	PETE
			272711	3 WITHCES
			280425	3 WITCHES
32S	47E	32	266188	RQ#5
		33	270373	Rocky Dog

There are a few very old-pits scattered throughout the area. The vast majority of these pits have been filled with sand, and vegetation is growing in the disturbed areas. There are a few buildings left at the Kinney camp, half a mile west of the proposed conservation area.

Members of at least four recreational prospecting and mining clubs frequent the area. The larger clubs may have a membership of 400 families. Most of these individuals are operating under casual use and may continue to do so as long as they reclaim their hand-dug pits and the cumulative disturbance does not cause more than "negligible" disturbance. Club members police themselves so as to not to cause unnecessary or undue degradation. One person

lives at the site in a trailer and is operating under a plan of operations. Club activities are discussed in more detail in Appendix P.

3.4.3.6 Reclamation and Restoration Procedures

Reclamation: This includes all activities associated with rehabilitating disturbed areas and generally returning it to a second, best productive use. In regulations under 43 CFR 3809.5, reclamation means taking measures required by this subpart following disturbance of public land caused by operations to meet applicable performance standards and achieve conditions required by BLM at the conclusion of operations.

Reclamation includes those activities associated with recontouring waste piles, reshaping pit walls and other excavations, removal of permanent or temporary facilities or structures, soil placement, soil preparation, and in some cases, reseeding and revegetation. Reclamation may also include measures to enhance previously disturbed areas or modify areas to conditions that previously existed. Habitat restoration may be required. This normally entails inventory and consideration of the desired plant community, as well as development of measures and time frames to assure recovery.

Operations under reclamation may utilize the same equipment to affect the reclamation requirements specified in the plan of operations where dirt work is needed, especially for the small level of operations examined under this assessment. Timeframes for completion of reclamation are considerably shorter than the length of time to create the disturbance. However, monitoring to assure complete reclamation or restoration may take many years, and access to the site as well as maintenance of facilities associated with reclamation maintenance (e.g., watering systems, water sampling sites/wells) are required to be in place during the period.

Restoration: This generally means to return the disturbed area to a condition that existed prior to surface disturbing activities. Elements typically include recontouring the surface to a pre-existing or natural shape, revegetation or the ability to revegetate with species native to the area. It may include placement of vegetation in the same locations that existed prior to conduct of operations, and re-channeling stream drainages to pre-existing locations and conditions.

3.4.3.7 State Designated Regionally Significant Construction Aggregate Resources

SMARA identifes a program for the classification and designation of regionally significant construction aggregate resources. When an area of the state is classified, the State Geologist transmits a classification report to the State Mining and Geology Board (SMGB) and to the lead agency (e.g the county where the lands identified are located). After receiving this classification information, the SMGB may designate specific geographic areas of the State as having "statewide or regional significance" for their mineral resources. Pub. Res. Code Section 2790. In designating an area, the SMGB takes into account "the adverse effects that might result from premature development of incompatible land uses, the advantages that might be achieved from extraction of minerals of the area, and the specific goals and policies to protect against the premature incompatible development of the area."

Areas designated as regionally significant are identified as "known to contain a deposit of minerals, the extraction of which is judged to be of prime importance in meeting future needs for minerals in a particular region of the state within which the minerals are located and which, if prematurely developed for alternative land uses, could result in the permanent loss of minerals that are of more than local significance." Pub. Res. Code Section 2726.

Varous lands throughout the planning area have been designated as a "Regionally Significant Construction Aggregate Resource Area" pursuant to the provisions of SMARA. The designation of these lands has been codified in the California Code of Regulations, at Title 14, Section 3550.9. The designation process included substantial environmental review, and included the participation of Federal, State and local agencies.

3.4.4 Recreation

Located only 90 minutes from downtown Los Angeles, the West Mojave is the recreational backyard of the metropolitan area's 17 million residents, of whom nearly 2 million participate in OHV activities and even greater number camp, hike or drive for pleasure. The Mojave Desert provides an easily accessible, uncrowded recreation experience. The many recreation opportunities of the West Mojave arise from the variety of its mountains, bajadas, dry lakes and badlands, the diversity and affluence of its visitors and the sheer volume of space that its landscape provides.

The types of recreation are highly varied. Due to its vastness, many visitors feel a greater freedom from regulations that encourages them to try new forms of recreation while not having to worry about bothering others. Given the scale of the desert and this sense of freedom, it is not surprising that many of the recreational activities center around vehicles, speed events or activities that require a great deal of acreage and separation from other visitors. These include motorcycle activities, four wheel drive exploring, sight seeing, target shooting, hunting, experimental vehicles/aircraft, model rocketry, and dry land wind sailing. Many other recreational pursuits that don't revolve around the recreational aspect of vehicle use are by necessity (due to the distances involved) dependent upon motorized vehicles. Examples of this include endurance equestrian rides and support vehicles, hiking, mountain biking, bird watching, botany, rockhounding, camping, and picnicking, for which vehicles are a means to access various destinations.

3.4.4.1 Patterns of Use

Although most recreational activities are widely dispersed, certaom activities have "hot spots" that have been established over time. How or why they were established varies from case to case, but may be due to the *features* (topography, geology) of the area, *proximity* to urban areas, the availability of *access* into the area, and *publicity*. Understanding recreation patterns and hot spots is critical to the design of an effective motorized vehicle access network.

Particular *features* or land-characteristics may make a given area highly desirable for a certain type (or types) of recreational activity. For instance, flat, expansive terrain is often desirable for recreational activities such as target shooting, plinking, driving for pleasure, and more quick-paced race events. On the other hand, mountainous terrain is often more conducive to such activities as rock (rope) climbing, rock hounding or technical four wheel rock crawling.

The relative *proximity* of the Mojave Desert to urban centers makes it easy and convenient for recreationists to visit those "hot spots" and other areas having the features that they desire. About 85% of all visitors to the Mojave Desert are from the urban areas of Southern California. The BLM public lands are closer to the Los Angeles basin than most other similar recreation areas, such as Death Valley National Park, and offer a far wider variety of recreational experiences.

Motorized vehicle *access*, or at least the degree of access, into areas affects the desirability of that area depending upon the nature of the recreational activity. Access is itself a feature or characteristic that may or may not be sought. For example, a recreationist hoping to photograph or film particular wildlife undisturbed in its natural habitat would not want access so convenient that it attracts a large number of other visitors. Recreationists seeking to hike and camp in remote, difficult to reach areas to experience solitude would not find a location that has ready access from a major highway to be desirable. Conversely, a recreationist seeking to ride his dune buggy over sand dunes with groups of other people would appreciate easy access.

Publicity about an area's recreational opportunity often attracts users. Although some of this publicity can come through the mainstream news media (newspapers, television news reports), much of it comes by "word of mouth." A recreation club (motorcycle riding club, four wheel drive club, dune buggy club, hiking and camping club, equestrian endurance riding club, rock hounding club, rock climbing club, photography club, or wildlife viewing club) may send out newsletters to its members identifying areas that have those features that are considered ideal for the type of recreational activity that the club engages in. This promotes discussion among club members about those areas, and encourages them to recreate there. Recreation clubs are often drawn to hot spots where people participating in that particular type of recreation can gather and socialize.

Publicity is not limited to recreational clubs. Individuals share their experiences with each other through "word of mouth." A camper may learn of an excellent campsite that possesses desirable features or characteristics. Through one-on-one conversations between different campers, such an area can become a "hot spot."

Guidebooks and maps publicize favorite recreation sites. Guidebooks are available that describe areas in the Mojave Desert that offer significant rockhounding and gem collecting opportunities. These guidebooks typically describe the areas of interest in sufficient detail to lead recreationists to the most promising regions for the activity. Maps published by the American Automobile Association are particularly popular, for they indicate areas where different types of recreational activities occur. Because they are widely distributed, areas highlighted on these maps can receive a great deal of notoriety.

Recreationists engage in activities that make use of more than one type of feature or terrain, and often desire to travel to locations where multiple types of terrain are readily available or that are relatively close to other areas having different terrain. In dual sport motorcycle touring, for instance, recreationists use motorcycles that are licensed for use on regular streets and highways but are capable of off-road travel. Recreationists engaged in such touring can ride to the desert on major highways, and then go off-road once a desired trail or special recreation opportunity has been reached. Since a motorcycle is being used, the recreationist can fit through tight spaces that a larger vehicle, even one with four-wheel drive, is unable to access.

The four-wheel drive vehicles have their attractions as well. A single four wheel drive SUV can accommodate more people and items than can a dual sport motorcycle, and can switch from regular highway travel to off-road touring without missing a beat. A trend among some recreationists is to alternate between areas having very different features since the use of their vehicles grants them such access opportunities. This affords the recreationist a much broader range of activities at any given time.

Table 3-52 presents a summary of recreation uses throughout the West Mojave. It describes the primary destinations and recreational activities that occur at particular geographic locations within the planning area. Detailed tables presenting visitor use levels at popular sites throughout the West Mojave are presented in Appendix T.

Table 3-52
Summary of Recreational Activities in the West Mojave Planning Area

AREA	LOCATION	PRIMARY DESTINATIONS AND RECREATIONAL ACTIVITIES
North El Paso	West of Ridgecrest & north of the EL Paso sub region.	This area is dispersed BLM ownership with an approximate size of 60 square miles. The area provides access from Ridgecrest to the El Paso Wilderness and the El Paso sub region.
Panamint Valley	Between North Searles and the Manly Peak Wilderness.	The Panamint Valley BLM area is solid ownership with an approximate size of 180 square miles and serves as access to North Searles sub region, Manly Peak Wilderness and Death Valley National Park.
Central Searles	Between North and South Searles and surrounding the town of Trona.	Central Searles is lightly dispersed BLM ownership comprising about 60 square miles and offering mining opportunities and access to North and South Searles sub regions.
East Fremont	West of US 395, north of Edwards Air Force Base and east of California City.	East Fremont BLM area is greatly dispersed BLM ownership with an approximate size of 200 square miles. The area offers desert exploring, rock hounding and mining opportunity in close proximity to California City.
West El Mirage	West of El Mirage sub region and west of El Mirage OHV Recreation Area.	West El Mirage is greatly dispersed BLM ownership with an approximate size of 100 square miles. The area offers access to OHV touring and El Mirage Dry Lake.
South Kramer	Between Kramer sub region and Highway 15, just north of Victorville.	Moderately dispersed BLM ownership with an approximate size of 120 square miles. The area offers OHV touring, exploring, mining opportunity and access to Stoddard Valley OHV Area.
South New-berry/ Rodman	South of the Rodman Mountains Wilderness and on the north edge of the Johnson Valley OHV Area.	This is a consolidated BLM ownership of approximately 8 square miles. The east boundary fronts a transmission line corridor offering OHV touring. Also the area offers access to the Rodman Mountains Wilderness and the Johnson Valley OHV Area.

AREA	LOCATION	PRIMARY DESTINATIONS AND RECREATIONAL ACTIVITIES
Johnson Valley South	South of Johnson Valley OHV Area and North of Bighorn sub region.	Johnson Valley South is moderately consolidated BLM ownership of approximately 50 square miles in size, mixed with State Lands and private lands. The area offers access to Johnson Valley OHV Area and the BLM Bighorn sub region and Soggy Lake & Creosote Rings Special Management Areas.
Copper Mountain	North of Joshua Tree National Park and northwest of the City of Twentynine Palms.	The Copper Mountain area is a greatly dispersed BLM ownership of about 100 square miles. The Twentynine Palms Marine Base bounds the area on the north, and Joshua Tree National Monument forms the south border. The area offers OHV touring and dual sport activity.
West Cleghorn	West of the Cleghorn Lakes Wilderness and bounded by Twentynine Palms Marine Base to the north and west.	The West Cleghorn area is a 30 square mile area of consolidated BLM ownership offering access to the Cleghorn Lakes Wilderness.
North Pinto	North of the BLM Pinto sub region and south of the Cleghorn Lakes Wilderness.	The North Pinto is a moderately consolidated BLM area approximately 60 square miles in size, offering OHV touring, mining and rock hounding.
South Coyote	About 30 miles east of Barstow, south of Afton Canyon Natural Area and north of the Sleeping Beauty sub region.	The South Coyote BLM area is a checkerboard ownership and is comprised of about 250 square miles. The Cady Mountains are located in the center of the area. The area serves as access to the Kelso Dunes Wilderness and Afton Canyon Natural Area and Sleeping Beauty sub region.
East Avawatz	About 12 miles north of the City of Baker on Highway 15. Wilderness Study Areas, which surround this area are the Soda Mountains to the south and Avawatz to the west.	The East Avawatz BLM area is about 100 square miles in size and is largely consolidated ownership offering access to Wilderness Study Areas. OHV touring and mining opportunities are available in the area.

BLM's CDCA Plan has designated several areas within the West Mojave as "Open Areas." Within open areas, unlike limited vehicle access areas, there is no "route designation." Motorized vehicles may travel anywhere, so long as the vehicle is operated responsibly in accordance with regulations, and subject to the permission of private landowners.

The OHV Open Areas receive high levels of dispersed OHV riding. Many repetitive OHV routes have been created in these areas that riders generally follow. In areas where the use is particularly concentrated, the density of routes can be very high. Table 3-53 briefly describes each open area, visitor use levels and the principal recreation activities that occur there.

Table 3-53
Characteristics of BLM Open Areas

OPEN AREA	SIZE ACRES	VISITS	VISITOR DAYS	PRINCIPAL RECREATION ACTIVITIES	OHV USE PATTERNS
Dove Springs	3,840	82,000	Not Available	Motorcycle hill climbing, ATV/Quads, rails; camping, shooting and hunting.	The entire Dove Springs open area is used for camping and OHV driving. OHV driving centers on riding up and down the hillsides using all types of OHVs.
El Mirage	25,600	253,374	391,075	Unrestricted OHV recreation. Approximately 50% of the activity is not classival OHV activity (i.e. motorcycles, quads, jeeps). The dry lakebed attracts visitors with experimental vehicles, aircraft, land wind-sailors, etc. The predominant OHV activity is motorcycle use.	Most of the visitor use is concentrated on and around the dry lakebed. Significant motorcycle use takes place away from the lakebed towards the mountains to the northwest. Visitors generally stay on long-established pre-existing routes. Permitted events, sightseeing, camping, and dispersed camping occurs in the area.
Jawbone Canyon		60,000	Not Available	Predominantly dirtbike motorcycle use engaging in hill climbing activities, as well as dual sport motorcycle and 4WD touring/sightseeing	Camping areas are oncentrated along three miles of the Jawbone Canyon Road. OHV users enjoy the challenge of riding up and down hillsides throughout the canyon. The steepness of the hillsides that the riders use varies from moderate to extremely steep.
Johnson Valley	188,160	Not Available	Not Available	Unrestricted OHV recreation. Predominantly dirt bike motorcycle use, as well as dual sport motorcycle and 4WD touring/sightseeing. Permitted events, camping, and dispersed camping occur in the area.	Primarily "Green Sticker" motorcycle use participating in "trail riding". Approximately 50% of the Open area's total use occurs in this area. Approximately 50% of that use takes place in the form of permitted "organized" events (e.g. races).
Rasor	22,400	23,702	36,357	Unrestricted OHV recreation. Predominantly dirt bike motorcycle use, as well as dual sport motorcycle and 4WD touring/sightseeing. Camping, dispersed camping, and sightseeing occur in the area.	Dispersed OHV use
Spangler Hills	62,080	Not Available	Not Available	Predominantly dirtbike motorcycle use, as well as dual sport motorcycle and 4WD touring/sightseeing on gentle rolling desert terrain.	The area provides many OHV routes through open, gentle desert terrain.. There are some more challenging routes through hills along the sides of

OPEN AREA	SIZE ACRES	VISITS	VISITOR DAYS	PRINCIPAL RECREATION ACTIVITIES	OHV USE PATTERNS
				Organized competitive events.	the open area. Three popular camping areas are Teagle Wash, Wagon Wheel and east of US-395.
Stoddard Valley	54,400	Not Available	Not Available	Unrestricted OHV recreation. Predominantly dirt bike motorcycle use, as well as dual sport motorcycle and 4WD touring/sightseeing. Permitted events, camping, and dispersed camping occur in the area.	OHV use is widely dispersed. Approximately 50% of the use is estimated to be associated with permitted events (e.g. MC, rails, jeeps). Heaviest use at staging areas. Visitors tend to stay on pre-existing routes as the terrain becomes rougher and as they travel away from the staging areas.

3.4.4.2 Trends

California's population is increasing rapidly. The State's population is projected to grow from 34 millon in 2000 to 46 million by 2020. The population of the planning area is projected to grow from 795,000 in 2000 to more than 1.5 million people by 2035.

California has the greatest number of off-highway vehicle recreation enthusiasts in the country[32]. Its 3.5 million recreationists constitute 14.2% of all California households. Since 1980, however, the number of acres available to OHVs for recreation has decreased 48 percent in California's deserts alone (from 13.5 million acres in 1980 to 7 million acres in 2000). At the same time, off-highway vehicle "green sticker" registrations have increased by 108%. Attendance at the State of California's State Vehicular Recreation Areas (SVRAs) increased from 1985 to 2000 by 52%.

OHV Vehicle Trends: Californians have embraced the sport utility vehicle (SUV). As SUV sales increase, the demand for off-highway opportunities for SUV owners is also on the rise. Simultaneously, there have been notable declines in motorcycle sales in California with steady increases in ATV and SUV sales. As a consequence, there appears to be a trend toward wider trails for larger off-highway vehicles (i.e., SUVs) as opposed to single-track trails used for motorcycling.

While the demand for OHV recreational opportunities is increasing along with California's growing population, OHV opportunities are decreasing. The increase in California's population has caused significant increases in urban development. Encroachment by cities threatens many rural OHV recreation areas. As more species are listed as threatened or endangered, sensitive habitats have been closed to OHV access. Air pollution controls imposed by the California Air Resources Board's Red Sticker Program have restricted the use of two-

32 OHV recreation contributes more than $3 billion to California's economy annually. OHV recreation generates roughly $1.6 billion in personal income and affects about 43,000 jobs within California.

cycle engine motorcycles in OHV riding areas to a limited number of months in the year instead of year-round.

Access for Disabled and the Elderly: OHVs allow disabled and elderly people to visit areas that are not otherwise available to them. In 1994, surveys were conducted at the Oceano Dunes SVRA. This survey revealed that approximately 9% of all those surveyed had within their group a disabled individual who was able to access the dunes and beach because vehicles were allowed in those areas. Increasing numbers of senior citizens will want to experience remote outdoor areas via OHV access. As the baby-boomer population continues to age, they would find it increasingly difficult to access these areas without the use of off-highway vehicles.

Behavioral Trends: With expanded leisure time and growing affluence of Southern Californians, conflicts have arisen between those who use vehicles as a means of access and those who operate vehicles as a recreational activity. Access can be for a variety of purposes, including economic pursuits and for recreation such as hunting and rockhounding. In addition, recreationists compete for space with other resource users. While strongly advocating that recreational facilities and regulations remain minimal, desert recreationists increasingly demand the protection of the natural and cultural values that are essential to most desert recreation. The public often cites scenic values as the Desert's most important resource.

"Tread Lightly!" is a national land-use ethics program designed to educate the public on using but not abusing the environment. This program has educated many OHV users on being respectful and responsible land users. As a result of such educational efforts, attitudes within many communities have improved on responsible OHV use.

A program called "Off-Road Pals," sponsored by the OHMVR Division and various law-enforcement agencies around California, has reached out to troubled youths, teaching them respect for the environment and for other people, while learning how to maintain and ride OHVs. This program has thus far provided more than 1,500 youths with positive and life-changing experiences. Such programs help to reduce juvenile delinquency and improve the lives of formerly at-risk youths.

Many OHV enthusiasts have donated their time to projects combating erosion, replanting recently burned forests, trash collection, renovating trails to improve rider safety, patrolling of OHV areas, and more. Such volunteerism indicates that most OHV enthusiasts care about the environment and are responsible in their use of off-highway vehicle areas.

Technological Improvements: OHV manufacturers have made huge strides in improving their vehicles to minimize excessive noise. Since 1990, noise levels from motorcycle dirt bikes have decreased from 96 to 88 decibels. Noise reduction can also be accomplished by utilizing specific design and construction techniques in OHV areas, through careful trail planning and construction of berms to impede or dissipate sound. Further technological innovations are being made to reduce noise, and air, pollution.

3.4.4.3 Off-Highway Vehicle Use

Users of off-highway vehicles engage in many different types of recreation in the Mojave Desert. These can be categorized into two general groups: (1) Where the driving of the vehicle is itself the recreational activity, and (2) Where the vehicle is a means of access to other forms of recreation.

3.4.4.3.1 Driving OHVs for Recreation

There are various types of OHV recreation. These include general vehicular touring, motorcycle recreation, and ATV and four-wheel-drive use.

General Vehicular Touring: Many people engage in recreational touring. Such touring allows visitors to see vast areas of the desert while spending less time on the land itself. OHV touring may occur on both flat and mountainous terrain using jeeps and similar vehicles.

OHV touring vehicles such as the popular SUV have four-wheel-drive (4WD) capabilities to handle off-road work and are designed to be comfortable for normal street usage. They do not have to be towed by another vehicle to particular staging areas; rather, they can be driven on the highway and, when opportunity presents itself, they can follow a dirt trail. Vehicles that have 4WD capability have a broader range of access opportunities since they can traverse different types of terrain features.

In the mid-1980s, off-road enthusiasts, and state and local government agencies collaborated to provide a system of interconnected roads and "jeep" trails. Today, over 600 miles of trails have been designated by the State of California as "Back Country Discovery Trails". A goal of this trail system is to provide a backcountry opportunity for non-traditional trail users such as persons with disabilities, senior citizens and families with small children.

The California Backcountry Discovery Trail system is one of shared-use. Equestrians, hikers, and cyclists are welcome, although the trail system is designed for off-road enthusiasts. The existing roads that make up the "principle route" network were selected with a stock, sport utility vehicle in mind. The CBDT network provides recreationists with an abundance of OHV touring opportunities. "Alternate trails" departing and later rejoining the principle route provide more challenging experiences, and are open to greensticker vehicles.

Motorcycle Recreation: Many desert recreationists engage in motorcycling and motorcycle events. In most (but not all) cases, the motorcycles, equipment and supplies have to be transported to the desired locations by street-legal vehicles, such as SUVs.

There are many popular motorcycle events, including enduros, hare n' hound, hare scramble, European scramble, and the grand prix. These events allow participants to ride in varying types of terrain, which present different challenges and require varying degrees of skill. Table 3-54 presents a descriptive summary of motorcycle events.

One popular activity is dual sport motorcycling. Dual sport motorcycles are designed to perform off-road, and they are also "street legal" for operation on paved roads. Therefore, the use of a street-legal vehicle to transport the bike is not necessary. A person using this type of motorcycle can enjoy riding on the highway, and then go off-road when the desired trail is reached. The dual sport motorcycle gives the rider a broader and more flexible recreational experience[33].

Table 3-54
Types of Motorcycle Events

NAME	TYPE OF START	SPEED EVENT YES/NO	COMMENTS
Grand Prix	Staggered	Y	The course is ten miles, and speed is important
European Scramble	Mass	Y	The race course is ten miles, using a mass start by class
Hare Scramble	Mass	Y	The race course is a 30 mile loop repeated for stronger riders
Hare & Hound	Mass	Y	The racecourse is two thirty-mile loops configured as a figure 8, not repeating the same track in the second loop. The second loop continues with only half the riders, and riders are spread out to such an extent that the second loop can be in a DWMA.
Enduro	Staggered	N	This is a time-controlled event, and speeds can be slowed through sensitive areas. Riders loose two points for every minute they are early to the finish and one point for every minute they are over the specified course time.
Dual Sport Ride	NA	NA	This is a tour event and portions of the ride can be on paved route as well as travel off road. The participant numbers can be limited to 50 to 100 entrants and speeds can be limited as well.

Each year there are a few commercial tours and dual sport rides on public land. These activities generally use well-defined public land vehicle routes. These tours typically involve motorcycle and 4-WD sightseeing and exploration tours. There are generally two types of commercial tour events: guided and unguided (self-guided):

- *Guided Tours:* A typical guided tour operator might lead two to three tours each year, with participants following a trail leader. The group stops together several times during the day to see and learn about various natural and man made features. The trip leader is generally an expert on the particular area, and is able to relay information pertaining to natural and historic resources to participants.
- *Unguided Tours (including Dual Sport Events):* Dual Sport Events, those events designed for street legal motorcycles capable of off highway travel, are the best example

33 The use of SUVs to transport dual sport bikes to motorcycle parks, other staging areas, or trailheads may still be the desired method of access. This is due largely to the distance that such recreationists travel, and the bulk of equipment and supplies that are often needed. An SUV allows for safe storage of equipment at the staging area.

of unguided tours. In these events, participants are given a map and "Roll Chart" that depict the tour route turn by turn. There is no element of competition so participants may arrive at the final destination at their convenience. Often "bail out" opportunities are identified so that participants can safely leave the off highway portion of the route to return to paved roads and the final destination on their own.

All Terrain and "Technical" Four Wheel Drive Recreation: ATVs are small motor vehicles with wheels or tractor treads for traveling over rough ground. They often have four-wheel-drive capability. ATVs are often viewed as being more agile than other four-wheel drive vehicles and can access narrower routes since they are relatively small and handle like motorcycles. ATVs, however, are only allowed to accommodate one person. ATVs are generally not appropriate for dual sport activities, since they are not legal on public highways.

Typical four-wheel-drive vehicles (SUVs and jeeps) have fairly similar capabilities, including the capability to travel off-road on rocky terrain. They are significantly larger than ATVs, as they can accommodate several passengers, supplies and equipment. Four-wheel-drive vehicles such as SUVs and jeeps often have "dual sport" capabilities and perform efficiently both on regular streets, roads, and highways, as well as off-road. SUVs are generally used to traverse relatively flat, yet rough, terrain, while jeeps with their narrower and shorter wheelbase are more capable of negotiating rougher terrain tnan a typical stock SUV.

Technical four-wheel-drive vehicles constitute a class of vehicle that includes jeeps, trucks and SUVs that have been significantly modified from their "stock" condition. Through the addition of specialty tires, transmissions, engines and suspensions these vehicles are less functional in open-highway situations, but very effective in traversing otherwise impassible routes (e.g. large boulders). "Rock-crawling" is an example of an activity that utilizes vehicles of this class. Travel is typically very slow (i.e. less than 5 mph) over and around rocks, in contrast to SUV and even jeep touring. Enthusiasts must possess a high level of technical "four-wheeling" skill. They may even employ the use of power winches to pull the vehicle over the more difficult rock formations. The challenge in technical four-wheel-drive use is to apply one's skills to cross the rocks, rather than tour large regions.

Competitive Events: The BLM Ridgecrest Field Office permits about 30 competitive events annually. These include about 20 OHV events and 10 dual sport, equestrian, mountain biking and running events. There are 50 miles of "C" (i.e. competition) routes established adjacent to the Spangler OHV Area. The use of these routes for competitive events was discontinued in 2001.

The BLM Barstow Field Office permits about 60 competitive events annually. These include about 50 OHV events and 10 dual sport, in addition to other events. Most of these events occur in the Stoddard and Johnson Valley Open Areas. The best known among these events are the Barstow to Vegas and Johnson Valley to Parker motorcycle races, neither of which has been run in over a decade.

Compliance With Regulations: Compliance has generally become better with implementation of the CDCA plan. With the exception of a few areas, OHV free play has gradually moved to the OHV open areas. Compliance is worst in areas of historic OHV use and adjacent to local communities. Compliance appears to be best achieved when a pro-active approach to vehicle management is used, including the identification of outstanding recreation opportunities to direct recreationists to, such as through quality signing and mapping to help visitors locate appropriate opportunities, as well as through enforcement and additional education efforts.

The best program for achieving compliance in designated route areas involves:

- Keeping open routes well signed.
- Revegetating and otherwise rehabilitating closed routes so that they are not apparent or easy to use.
- Maintain a field presence of BLM personnel to contact, inform visitors, and enforce the law.
- Establishing BLM-trained and supervised volunteer groups who can assist in keeping the routes signed and who can contact visitors in order to explain applicable use policies.

Once vehicle routes have been designed, they need to be maintained as a way of keeping users on those open routes. If open routes become too difficult to travel, recreational visitors would be more likely to utilize closed routes.

3.4.4.3.2 Driving OHVs to Access Other Recreation

Many visitors use the vehicle as a means to attain a recreation end, rather than as the end itself. These recreation types fall into two classes: (a) point and (b) dispersed forms of recreation.

Point Forms of Recreation: Often an OHV is driven to a specific destination such as a trailhead, staging area, or campsite. For instance, equestrians use an OHV to tow horse trailers and other equipment to designated staging areas where they can set up for horseback riding. The recreational activity is not the driving of the OHV itself; it is merely used to access the staging area for the equestrian ride. Similarly, hikers may use an OHV to travel to a trailhead; once there, the recreationist would then begin their hike.

Dispersed Forms of Recreation: This form of recreation is more dependent upon vehicle use than point forms, but the use of the vehicle is still not viewed as the primary source of recreation. For instance, a recreationist who desires to photograph a particular species of wildlife or wildflower may hike, ride a horse or use an OHV to search for a subject. Driving a vehicle is not the primary recreation; photography is. Because there is no specific destination, this form of recreation is referred to as "dispersed" rather than "point."

3.4.4.4 Economic Contribution of OHV Recreation

Off highway vehicle recreationists, whether they use OHVs as a means to access other forms of recreation, or find recreation opportunities in the driving of the OHV itself, will contribute to the local economies of the planning area in a variety of ways. These depend on the level of use in areas surrounding desert towns, and the future significance of that contribution depends on the nature of ongoing recreation use trends. Table 3-55 addresses the various ways by which recreation contributes dollars to local economies.

Table 3-55
Recreation Economic Contribution

REGION OR CITY	PRINCIPAL RECREATIONAL ACTIVITIES ON ADJOINING PUBLIC LANDS	OHV USE IN NEARBY AREAS	SOURCES OF ECONOMIC CONTRIBUTION	TRENDS IN GROWTH	COMMENTS
Inyo County (Pearsonville Little Lake)	Commercial filming Motorcycle touring	Low	Fuel, food	Increasing as the LA Basin grows	Most visitors to the area will acquire supplies in larger communities further south
Kern County	Large range of vehicle dependent recreational activities	Cummala-tively High	Lodging, meals, supplies, vehicle repairs, fuel.	Increasing	Given the close proximity of this portion of Kern County to the LA Basin and that it serves as the "Gateway" to the Sierras and the Desert growth is high and is expected to increase.
California City	OHV touring in the Rand and El Paso mountains – off road motor cycle play	Moderate	Fuel, camping supplies, and food	Has been increasing with the growth of the LA Basin.	Visitors coming over the Tehachapi and headed to the Rands and El Paso mountains will likely stop in California City. In spite of recent closures in the Rands, the level of use outside of California City has not diminished. The closures have in fact increased demands on local law enforcement due to increased private property trespass.
Mojave	SUV touring, Off-Road Events for 4 X 4 and motorcycle and all desert play vehicles	High	Vehicle repairs and vehicle parts, fuel, camping supplies, motels, and food	Increasing significant-ly with growth in LA Basin and the increasing popularity of desert.	The Tehachapi pass carries a significant load of Recreation Traffic from the San Joaquin valley headed to the Mojave Region. Certainly any increase in recreation activity has a potential for economic gain for Mojave.

REGION OR CITY	PRINCIPAL RECREATIONAL ACTIVITIES ON ADJOINING PUBLIC LANDS	OHV USE IN NEARBY AREAS	SOURCES OF ECONOMIC CONTRIBUTION	TRENDS IN GROWTH	COMMENTS
Ridgecrest	SUV touring, organized OHV events, rock hounding, commercial filming	High	Vehicle repairs and parts, fuel, camping supplies, food, hotels	Increasing	Viewed as both a significant current and future source of economic revenues
San Bernardino County	Large range of vehicle dependent recreational activities	Cummala-tively High	Lodging, meals, supplies, vehicle repairs, fuel.	Increasing	Given the close proximity of this portion of San Bernardino County to the LA Basin and the "Inland Empire" and that it serves via I-15/US 395 as the "Gateway" to the Sierras and the Desert growth is high and is expected to increase.
Baker	SUV Touring, OHV Events, 4WD and motor cycle play, rock hounding, mining exploration	Low	Vehicle repairs and vehicle parts, fuel, camping supplies, motels, and food	Slight increase due to remoteness.	Baker is at the eastern edge of the study area and most users come out of the LA basin and the San Joaquin Valley. Therefore most recreation expenditures for the Mojave come from recreation users not going thru Baker.
Barstow	SUV Touring, OHV events, 4WD and motorcycle play, rock hounding, mining exploration	High	Vehicle repairs and vehicle parts, fuel, camping supplies, motels and food	Increasing	Barstow is at the heart of the Mojave Study Area with traffic coming in from LA via highway 15 and from the west via highway 58. An increase in recreation related expenditures could have a significant positive effect on Barstow.
Dagget	SUV touring, OHV Events, 4WD and motorcycle play, rock hound, mining exploration	Low	Fuel, and Food	Increasing Slightly	Dagget is located about 5 miles east of Barstow and majority of travelers will stock up in Barstow and only use Dagget for last minute supplies. Therefore a light increase in recreation activity will have a very slight economic impact to this small community.

REGION OR CITY	PRINCIPAL RECREATIONAL ACTIVITIES ON ADJOINING PUBLIC LANDS	OHV USE IN NEARBY AREAS	SOURCES OF ECONOMIC CONTRIBUTION	TRENDS IN GROWTH	COMMENTS
Lucerne Valley	SUV Touring, Desert exploring via 4WD and motor cycle, rock hounding, and mining exploration	Low	Fuel, camping supplies, and food	Slight increase; due to the fact that the area is somewhat "off the beaten path" the level of growth is less than other areas.	Lucerne Valley is located just north of the San Bernardino Mountains about 10 miles east of Apple Valley. The following BLM sub regions surround Lucerne Valley: Juniper, Granite, Ord, and Bighorn, also to the east is Johnson Valley Off-Highway Vehicle Recreation Area. Lucerne does not serve a large number of travelers.
Ludlow	SUV touring, OHV Events, 4WD and motorcycle play, rock hound, mining exploration	Low	Fuel, and Food	Increasing Slightly	Ludlow is located about 50 miles east of Barstow and majority of travelers will stock up in Barstow. Therefore a light increase in recreation activity will have a very slight economic impact to this small community.
Newberry Springs	SUV touring, OHV Events, 4WD and motorcycle play, rock hound, mining exploration	Low	Fuel, and Food	Increasing Slightly	Newberry Springs is located about 18 miles east of Barstow and majority of travelers will to their business in the bigger city. Therefore a light increase in recreation activity will have a very slight economic impact to this small community.
Trona	Commercial filming, motorcycle touring	Low	Fuel, food	Increasing as visitation increases to Death Valley NP	Although most visitors to the area get supplies in Ridgecrest, the future economic contribution to this economically depressed community is significant

REGION OR CITY	PRINCIPAL RECREATIONAL ACTIVITIES ON ADJOINING PUBLIC LANDS	OHV USE IN NEARBY AREAS	SOURCES OF ECONOMIC CONTRIBUTION	TRENDS IN GROWTH	COMMENTS
Victorville / Apple Valley	SUV Touring, OHV Event, 4WD and motorcycle play, rock hounding, mining exploration	High	Vehicle repairs and vehicle parts, fuel, camping supplies, lodging, food	Increasing	Victorville does receive a high volume of recreation traffic leaving the LA basin on Highway 15. It is close to The Stoddard Valley OHV Area, Johnson Valley OHV Area, and Granite, Ord, and Juniper BLM Sub Regions. Any increases in OHV recreation could result in significant monetary inputs into the local economy.
Yucca Valley	SUV touring, desert exploring via 4WD and motor cycle, rock hounding, and ming exploration	Low	Fuel, camping supplies and food	Slight increase; most of the recreation growth is to the northwest.	Yucca Valley is east of the San Bernardino Mountains, and south of the BLM sub region of Bighorn and north of the Morongo sub region. Yucca Valley not on major highway and relative to other cities not serve large volume of recreation traffic

Source: Advance Resource Solutions, Inc.

3.4.5 Circulation and Landfills

3.4.5.1 Circulation Element

3.4.5.1.1 Transportation Methods

Transportation methods in the West Mojave are not unlike those of other communities. The movement of humans and agricultural and industrial products in and out of the planning area is provided by a variety of systems associated with smaller urban centers and rural areas. The planning area serves as a major transportation corridor taking goods and people in and out of the Los Angeles and Kern County metropolitan areas. With the completion of the Alameda Corridor the movement of goods is expected to continue to increase. Relatively inexpensive housing and the rural lifestyle of the planning area make commuting into the more populated coastal area attractive for many residents. This trend is expected to continue with the large increase in population that is expected. The planning area has a number of different means of transportation and these systems have been developed to connect farm/industrial/commercial centers to cities, and cities to communities within the County and state, and in other states and other nations.

State System - California Department of Transportation (Caltrans): The State of California has established a series of state-constructed and maintained routes in accordance with the Street & Highway Code, Art. 3, Sec. 300 et.seq. State roadways in the planning area consist of Interstate freeways, freeways, expressways, highways and surface streets. For more than 100 years, Caltrans and its predecessors have been responsible for designing, building, operating and maintaining the California state highway system. As the population of California has increased, Caltrans' role has expanded to include mass transit systems. In addition to a changing mix of transportation modes, such as highways, rail, mass transit and aeronautics, Caltrans professionals must consider the integration of various transit issues with land use, environmental standards and the formation of partnerships among private industry and local, state and federal agencies.

Caltrans operates and maintains 15,000 miles of roadways included in the State Highway System, and is responsible for ensuring proper distribution of the State Transportation Improvement Program, including the application of $3 billion used for construction (1997).

Mass Transit: Mass transit and rapid transit systems in the planning area are limited to the more conventional modes, specifically bus. There are many sources of bus public transit within the plan area. The largest providers in the area include:

- *Victor Valley Transit Authority:* The Victor Valley Transit Authority (VVTA) serves the cities of Adelanto, Hesperia and Victorville; the Town of Apple Valley; and the unincorporated communities of Phelan, Wrightwood, Pinon Hills, and Helendale. This transit system carries more than a million passengers annually. Service includes standard bus operations, plus curb-to-curb service for disabled persons.

- *Morongo Basin Transit Authority:* The Morongo Basin Transit Authority transports nearly 143,000 passengers each year in the City of Twentynine Palms, Town of Yucca Valley and the unincorporated communities of Joshua Tree, Landers, Flamingo Heights, and Yucca Mesa.

- *Barstow Area Transport:* The City of Barstow administers the operation of the Barstow Area Transit, as well as two San Bernardino County-supported specialized services for seniors and persons with disabilities in the communities of Big River and Trona. The system carries more than 144,000 passengers each year.

- *Antelope Valley Transit Authority:* The Antelope Valley Transit Authority serves the Lancaster/Palmdale area. They provide a variety of services including local and commuter services. The transit system carries more than a million passengers annually.

- *Kern Regional Transit (KRT):* KRT operates a fleet of 30 vehicles ranging in size from 15 passenger paratransit minibuses to thirty-foot, heavy duty transit buses, with service in excess of 1.2 million miles. The Kern Regional Transit connects Taft, Frazier Park, Lancaster, Mojave, Wasco/Shafter, Delano, California City, Tehachapi, Ridgecrest, and Inyokern with Bakersfield and with a ridership of over 450,000 passengers.

Rail: The West Mojave planning area is a major rail corridor for bringing goods in and out of the Southern California ports and metropolitan area. The entire rail network is operated by the private sector with the Southern Pacific, the Burlington Northern – Santa Fe rail systems carrying freight through and beyond the boundaries of the planning area. With the completion of the Alameda Corridor rail traffic is expected to increase to even higher levels in the future.

Aviation: There are several airports operating in the planning area. These facilities provide opportunities for air traffic and the movement of goods. A wide variety of air flights come out of the region including small private plane operations, passenger flights and freight movement. In addition to the municipal and community airports, there are several military airfields located within the planning area.

Non-motorized Transportation: The climate in the West Mojave is well suited for bicycle travel at many times during the year. Bikeways exist in most cities and in some unincorporated portions of the planning area. Most bikeways exist as marked lanes on surface streets within the communities. Many of the more recently developed portions of the planning area provide for foot traffic along sidewalks in residential areas while some of the older subdivisions make no provisions for pedestrians. Generally speaking, foot traffic pathways between unincorporated communities are nonexistent.

Motor Vehicles: Automobile, truck, and motorcycle traffic can use the varied network of roads and highways developed by the State and County. This mode of transportation is by far the most used system in the planning area, with roadways under State, County, service area, and private entity control. In addition to the movement of goods by rail, the planning area is a major corridor for the movement of goods by truck, again connecting Southern California to the rest of the United States. Caltrans, the Counties of Inyo, Kern, Los Angeles and San Bernardino and each incorporated community manage motor vehicle systems in the planning area. The counties maintain many of the roadways within cities by contract.

3.4.5.1.2 West Mojave Planning Area Roads

The road system within the planning area is mostly composed of four classifications of roads: major highways, arterials, collectors and local streets. Design, construction and maintenance of the surface road system is the responsibility of each local jurisdiction's roads department or Caltrans.

The following road standards are left purposefully vague do to the numerous jurisdictions within the planning area. Specific road standards are available from each local jurisdiction.

Major Highways - There are many major roadways that connect this large plan area. Most of the roads are two to four lane roads with some expanding to eight lanes in the more urban section of the planning area. These roads are state and US routes and are maintained by Caltrans. These roadways include:

- State Route 14: This route is classed as a major conventional highway/freeway. It is a north-south route located in Los Angeles County.

- State Route 18: This route is classed as a major conventional highway. It is an east-west route located in the southern portion of the plan area in San Bernardino County, with a short section in Los Angeles County.

- State Route 58: This route is classed as a major conventional highway/freeway. It is an east-west route located in San Bernardino and Kern Counties. This highway has many four-lane sections along its alignment.

- State Route 62: This route is classed as a major conventional highway. It is an east-west route located in San Bernardino County.

- State Route 127: This route is classed as a conventional highway. It is a north-south route located in San Bernardino and Inyo Counties.

- State Route 138: This route is classed as a major conventional highway/expressway. It is an east-west route located in Los Angeles and San Bernardino Counties.

- State Route 178: This route is classed as a conventional highway. It is an east-west route located in Inyo, Kern and San Bernardino Counties. This Highway expands to four lanes through Ridgecrest in the plan area.

- State Route 190: This route is classified as a conventional highway. It is an east-west route located in Inyo County.

- State Route 202:This route is classed as a conventional highway. It is an east-west route located in eastern Kern County.

- State Route 223: This route is classed as a conventional highway. It is an east-west route located Kern County.

- State Route 247: This route is classed as a conventional highway. It is a north-south route located in San Bernardino County.

- U.S. Route 95: This route is classed as a major conventional highway. It is a north-south route located in Eastern San Bernardino County.

- U.S. Route 395: This route is classed as a major conventional highway/expressway. It is a north-south route passing through San Bernardino, Kern and Inyo Counties.

- Interstate Route15: This route is classified as a major interstate. It runs northeast through San Bernardino County from the southwest corner of the plan area to the northeast.

- Interstate Route 40: This route is classified as a major interstate. It runs east west through the southern section of the plan area through San Bernardino County.

Arterials: Arterials are routes with high traffic carrying capacity. An arterial might be defined as a road which is used, designed to be used, or is necessary to carry high volumes of traffic. An arterial, when constructed to its ultimate standard, are typically two lanes of traffic and a parking lane each way separated by a median with additional right-of-way on either side. Access is typically limited in order to minimize potential conflicts. Subdivision standards limit access to two intersecting local streets between arterials and collectors (1/2 mile distance), with no intersection closer than 660' to another. Also, developers are usually required to abandon the right of vehicular access from lots adjacent arterials. Actual listing of arterial locations is too numerous for this report. Arterials are usually within a 110' right-of-way and provide a connecting route between population centers and major highways. Arterials may also form the boundaries for neighborhoods. At present, numerous arterial alignments, especially in the rural areas, exist at local street standards (approximately 60-foot right-of-way). It is anticipated that development and traffic demand would result, ultimately, in the widening of these roads.

Collectors: Collectors are the next lower level of traffic carrying capacity. These routes carry lower volumes of traffic than arterials, but more than local streets. Collectors serve as collections for local street systems directing traffic to the arterials. These roads occasionally serve as boundary streets for neighborhoods and as a general rule are located along mid-section lines. The collectors usually have two-travel lanes and a parking lane each way with minimal additional right-of-way. While some residential lots may have access to collectors, it is preferable that access is limited and access to properties is directed to local streets.

Local Street: Local circulation routes generally provide access directly to abutting properties. Under existing standards, these roadways consist of approximately 40 foot traveled way improved sections and 10-foot parkways on each side. The width of these roads varies a great deal with newer developments usually having wider travel lanes.

3.4.5.2 Landfills

Solid waste produced in the planning area is collected by private contractors and deposited in the numerous landfills located throughout the region. Landfills in each county are described below. Descriptions include[34]: size and location, presence of septage ponds and fencing, the method of covering the working face, litter control measures, and planned future use of the site. Inactive sites are included on the list. A landfill is a waste management unit at which waste is discharged in or on land for disposal. This does not include surface impoundment, waste pile, land treatment unit, injection well, or soil amendments. The State Water Resources Control Board establishes the classification for landfills. A Class III facility is permitted to accept residential, commercial, industrial, agricultural, demolition and non-hazardous inert wastes. In addition to permitted and active landfill sites, illegal dumping occurs throughout the planning area, including at many "closed" landfill sites. Solid waste management agencies are implementing actions to discourage illegal dumping, such as providing convenient locations for transfer stations in more remote communities.

34 Source of data is California Integrated Waste Management Board, Solid waste Information System (SWIS) at www.ciwmb.ca.gov/SWIS

Inyo County: There are no landfill sites located within the planning area. The Olancha landfill has been closed and converted to a transfer station. The Olancha transfer station is located about a mile east of Olancha on highway 190, and accepts mixed municipal wastes. This transfer station has a permitted capacity of 36 cubic yards. There is another limited volume transfer station on Homewood Canyon Road, about one mile west of Trona-Wildrose Road, which serves the Valley Wells area. The Inyo County Integrated Waste Management Department operates both transfer stations.

Kern County: The Kern County Waste Management Department operates Class III landfill sites at Boron, Mojave-Rosamond and Ridgecrest. In addition, a transfer station equipped with 14 three-cubic yard trash bins is available for local resident use in the community of Randsburg. Property owners are charged a $57 special assessment on their property tax bill for waste management services. There is no gate fee for residents at the landfills for disposal of household or yard waste that would normally go into a residential waste can. Commercial/industrial waste disposal fees are $29.00 per ton, and the cost for disposing of dead animals is $5.00 if 200 pounds for less, and $10.00 for animals larger than 200 pounds. A 50% discount is available for disposal of source separated recyclable materials at a disposal site that has a recycling program in place for the type of material being disposed.

***Boron Sanitary Landfill*:** The Boron landfill is a Class III landfill located in the community of Boron in the southeast portion of the county, and is owned and operated by the Kern County Waste Management Department. The 20-acre facility has about 14 acres of disposal area. The facility is permitted through the California Integrated Waste Management Board for 200 tons per day and has a permitted capacity of 1,002,819 cubic yards. Remaining capacity as of June 21, 2001 was 208,632 cubic yards. The estimated closure date for this landfill is 2013. The facility is limited to a landfill; there are no septage ponds. The site is completely fenced with chain-link for security; however, dogs and other scavengers can access the area by digging under the fence. Ravens are present. The working face is covered daily with a minimum of 6 inches of compacted soil or an approved alternate daily cover (ADC) such as a geosynthetic tarp. Litter is controlled with a temporary fence that is located downwind from the working face. Litter pick-up crews are deployed after heavy winds.

Mojave-Rosamond Sanitary Landfill: This Class III landfill is located on Silver Queen Road in the community of Mojave. The facility is owned and operated by Kern County Waste Management Department. The 40-acre landfill has about 27 acres of disposal area. This facility is currently being re-permitted to allow for disposal of up to 470 tons per day with a permitted site capacity of 2,262,243 cubic yards. The facility has a remaining capacity of 443,681cubic yards (as of January 2002 Capacity Study). The estimated closure date for the landfill is 2014. Facilities are limited to an area method type landfill; there are no septage ponds. The site is completely fenced with chain-link and hog wire for security. Ravens are present. The working face is covered daily with a minimum of 6 inches of compacted soil or an approved ADC, such as a geosynthetic tarp. Litter is controlled with a temporary fence that is located downwind from the working face. Litter pick-up crews are deployed after heavy winds.

Ridgecrest-Inyokern Sanitary Landfill: This is a Class III landfill located on Bowman Road, 5 miles southwest of Ridgecrest. The facility is owned and operated by the Kern County Waste Management Department. The facility is located on 321 acres, 91 acres of which is devoted to waste disposal activities. The site has a permitted capacity of 5,992,700 cubic yards, and a remaining capacity, as of January 2002, of 1,287,587 cubic yards The landfill is permitted to accept 701 tons of waste per day, and has an estimated closure date of 2012. Facilities are limited to an area method type landfill; there are no septage ponds. The site is completely fenced with chain-link and hog wire for security. Dog and other scavengers are able to get in under the fence at certain locations, but ravens are not a major problem. The working face is covered daily with a minimum of 6 inches of compacted soil or an approved ADC, such as a geosynthetic tarp. Litter is controlled with a temporary fence that is located downwind from the working face. Litter pick-up crews are deployed after heavy winds.

Randsburg Transfer Station: This facility is located on Goler Road in the community of Randsburg to facilitate the handling of solid waste in this rural community. It is a limited volume transfer operation with a maximum permitted throughput of 60 cubic yards per day.

In addition to the Kern County landfill sites, U.S. Borax owns and operates a class III landfill for construction/demolition and industrial wastes at its site on Boron Road in the community of Boron. This site is permitted for 8,500,000 cubic yards with a permitted throughput of 443 tons per day. Remaining capacity for this site as of May 17, 2001, is 1,400,000 cubic yards. This site has an estimated closure date of 2023.

Edwards Airforce Base recently closed a small (2 tons per day) class II solid waste disposal site located approximately 1.5 miles south of Leuhman Ridge, east of Mars Blvd. This site was officially closed as of August 1, 2002. The Edwards AFB Main Base Sanitary Landfill is still operational and accepting waste. This facility is permitted to accept up to 180 tons of waste per day.

Los Angeles County: Two regional landfill sites are located in the Antelope Valley area of Los Angeles County, and serve the cities of Palmdale and Lancaster, as well as the rural unincorporated areas. Tipping fees at these facilities is $38.00 per ton. Loads less than one ton are charged a $20.00 fee. Additional information on these and other facilities in the area are as follows:

Antelope Valley Public Landfill: This class III landfill facility, located on West City Ranch Road in Palmdale, is owned and operated by Waste Management of California, Inc. This site serves the City of Palmdale and the surrounding unincorporated county area. This facility was permitted in June 1997 with a permitted throughput of 1,800 tons per day. As of December 31, 2000, there was 9,093,000 tons of remaining capacity. It is located on 756 acres of which 54 acres are indicated for waste disposal. The site includes a landfill with no septage ponds. It is fenced with six-foot chain-link for security. No scavenger problems of any type have been noted. The working face is covered daily with a minimum of 6 inches of compacted soil or with a special cover made of lightweight fibrous material and anchored with tires. Litter control is provided by a high net fence and portable units located near the working face.

Lancaster Landfill and Recycling Center: This class III landfill facility is located on East Avenue F, Lancaster, and serves the city of Lancaster and the surrounding unincorporated county area. The landfill is owned and operated by Waste Management of California, Inc. It occupies 276 acres, of which 209 acres are identified for waste disposal. The facility is permitted for a capacity of 22,645,000 cubic yards with a permitted throughput of 1,700 tons per day. As of December 31, 2000, there was 20,583,180 cubic yards of remaining capacity. The site includes a landfill with no septage ponds. It is fenced with six-foot chain-link for security. Ravens have been noted in the area but not in substantial numbers. The working face is covered daily with a minimum of 6 inches of compacted soil or with a special cover made of a light weight fibrous material and anchored with tires. Litter control is provided by a high net fence and portable units located near the working face.

In addition to these two landfills, the City of Lancaster owns and maintains a medium volume transfer/processing facility at their city yard on North 7th Street West. This 16-acre facility has a permitted capacity of 11,550 cubic cards with a throughput of 100 tons per day.

San Bernardino County: County of San Bernardino Solid Waste Management Division (SBSWMD) is responsible for the operation and management of San Bernardino County's solid waste disposal system. SBSWMD owns and operates three landfills and eight transfer stations within the planning area. Landfill operations are no longer occurring at the following locations because they are in the process of being closed: Newberry Disposal Site (SWIS # 33-AA-0039), the Phelan Refuse Disposal Site (SWIS # 36-AA-0044, the Hesperia Refuse Disposal Site (SWIS # 36-AA-0050), the Twentynine Palms disposal Site (SWIS# 36-AA-0060), the Lenwood-Hinkley Refuse Disposal Site (SWIS # 36-AA-0061), The Lucerne Valley Disposal Site (SWIS # 36-AA-0062), the Yermo Disposal Site (SWIS # 36-AA-0047) and the Apple Valley Disposal Site (SWIS #36-AA-0048).

Disposal fees at all county sites is as follows:

- $10.00 for up to 500 pounds of ordinary residential waste
- $34.30 per ton for residential waste over 500 pounds (prorated)
- $84.30 per ton for waste requiring special handling
- $103.78 per ton for tires

The SBSWMD operates the facilities through its contract operator, Burrtec Waste Industries, Inc. The contract operator handles the day-to-day operations and maintenance of the County's Solid Waste Disposal System, including both its Landfills (both active and inactive) and its Transfer Stations.

Additional information on solid waste facilities in San Bernardino County is as follows:

Barstow Landfill (SWIS # 36-AA-0046): The Barstow Landfill (BSL) is a Class III disposal facility with two, Class II, lined surface impoundments accepting only non-hazardous solid wastes. The BSL began operations in 1963 and has been in continuous operation since that time. The landfill is located in an unincorporated portion of the County on Barstow Road,

approximately 3 miles south of the City of Barstow, off State Highway 247. The landfill disposal operations are currently being conducted within an approximately 47-acre refuse disposal footprint of an approximately 640-acre site; the remaining land is utilized for the scale facility, land farming and surface impoundments. Approximately 480 acres are still undisturbed and are reserved for future expansion. The landfill has a permitted capacity of 3,584,000 cubic yards of which 94,086 cubic yards was remaining as of July 8, 2002. The current operation at the current pit has an estimated closure date of 2007. The site is located in an area designated by the USFWS as critical habitat for the desert tortoise. The facility includes a landfill and two septage ponds. The active landfill area is fenced for security but the fence is not adequate to keep scavengers out. The ponds are not covered and may attract ravens. The working face is covered daily with a minimum of 6 inches of compacted soil.

Landers Landfill (SWIS # 36-AA-0057): The Landers Sanitary Landfill (LSL) is a Class III facility on 637 acres, 44 of which are used for solid waste disposal. The site is located on Winters Road, east of S. Avalon Avenue in the unincorporated community of Landers. The LSL was acquired by SBSWMD in a land transfer from the Bureau of Land Management in November 2000. The landfill has a permitted capacity of 3,080,000 cubic yards, with a permitted throughput of 1200 tons per day. Remaining capacity was 326,201 cubic yards as of July 8, 2002. The site has an estimated closure date of 2008. After that date the material will be transported and be replaced by transfer stations and solid waste will be transported to Victorville or Barstow. Facilities include a landfill and four septage ponds. The site is about 80 percent fenced with chain-link for security, which is probably not adequate to keep scavengers out. Recent inspections indicate a very large number of ravens at this facility compared to nine other landfills visited in San Bernardino County. The working face is covered daily with a minimum of 6 inches of compacted soil.

Victorville Landfill (SWIS # 36-AA-0045): The Victorville Sanitary Landfill (VSL) is a Class III regional landfill facility and is located on Stoddard Wells Road, in Victorville. The site has a total acreage of 80-acres, 67 of which are used for waste disposal, seven acres were used as septage drying ponds and six acres comprised a daily/intermediate soil cover borrow area. In 1998, the facility ceased accepting liquid waste and in September 2000, the liquid waste surface impoundments were clean closed in compliance with applicable regulations.

This facility has a permitted capacity of 7,700,000 cubic yards, with permitted throughput of 1,600 tons per day. The remaining capacity was 277,879 cubic yards as of July 8, 2002. The active area of the landfill that is currently in operation has an estimate closure date of 2005. The expansion area would continue to operate beyond this date. The facility includes a sanitary landfill, the inactive surface impoundment area, and a borrow pit. The entire site is fenced with six-foot chain-link for security and to reduce entry by scavengers. The working face is covered daily with a minimum 6 inches of compacted soil. There is illegal dumping outside of the fenced area and litter controls have, at times, not been effective.

A biological opinion (1-8-94-F-8) was issued for the 37.5 acre borrow pit located adjacent to the landfill. The terms and conditions are generally the same as for the mining operation, including the installation of tortoise proof fences to keep tortoises out of the pit area.

Limited Volume Transfer Operation is an operation that receives less than 60 cubic yards, or 15 tons of solid waste per operating day for the purpose of storing the waste prior to transferring the waste to another solid waste operation or facility and which does not conduct processing activities. Limited salvaging activities and volume reduction may also be conduct as part of the operation.

Apple Valley Community Collection Center: This facility, located on Laguna Secca Drive in Apple Valley, is a limited volume transfer operation. The facility accepts mixed municipal waste and has a permitted capacity and throughput of 60 cubic yards per day.

Baker Community Collection Center: This facility, located south of I-15 on Kelbaker Road in the community of Baker, is a limited volume transfer operation. The facility accepts mixed municipal waste and has a permitted capacity and throughput of 60 cubic yards per day.

Daggett/Silver Valley Community Collection Center: This facility, located on the northeast corner of Hidden springs Road and National Trails Highway in the community of Daggett, is a limited volume transfer operation. The facility accepts mixed municipal waste and has a permitted capacity and throughput of 60 cubic yards per day.

Hesperia Community Collection Center: This facility, located on Hesperia Dump Road in Hesperia, is a limited volume transfer operation. The facility accepts mixed municipal waste and has a permitted capacity and throughput of 60 cubic yards per day.

Yermo Community Collection Center: This facility, located on Minneola Road in the unincorporated community of Yermo, is a limited volume transfer operation. The facility accepts mixed municipal waste and has a permitted capacity and throughput of 60 cubic yards per day.

Large Volume Transfer/Processing Facility is a facility that receives 100 tons or more of solid waste per operating day for the purpose of storing, handling or processing the waste prior to transferring the waste to another solid waste operation or facility.

Lucerne Valley (Camp Rock) Transfer Station (SWIS # 36-AA-0317): This facility, located on 7 acres on Camp Rock Road in the unincorporated community of Lucerne Valley, is a large volume transfer station. The facility accepts mixed municipal waste and has a design capacity and a permitted throughput of 14 tons per day.

Newberry Springs Transfer Station (SWIS # 36-AA-0371): This facility, located on 3 acres on Troy Road and Poniente Drive in the community of Newberry Springs, is a large volume transfer station. The facility accepts mixed municipal waste and has a permitted capacity of 140 cubic yards per day and a permitted throughput of 7 tons per day.

Phelan (Sheep Creek) Transfer Station (SWIS # 36-AA-0382): This facility, located on 5 acres on Buckwheat Road in the unincorporated community of Phelan, is a large volume transfer/processing facility. The facility accepts mixed municipal waste and has a design capacity of 1,600 cubic yards per day and a permitted throughput of 198 tons per day.

Trona-Agrus Transfer Station (SWIS # 36-AA-0391): This facility, located on 2 acres on 1st Street approximately 1 mile north of Trona Road in the unincorporated community of Trona, is a large volume transfer/processing facility. The facility accepts mixed municipal, agricultural, construction/demolition, industrial waste and tires. It has a permitted capacity of 352 tons and a permitted throughput of 88 tons per day.

29 Palms Transfer Station (SWIS # 36-AA-0390): This facility, located on Pinto Mountain Road in Twentynine Palms, is a large volume transfer/processing facility. The facility accepts agricultural, ash, construction/demolition, industrial, and mixed municipal waste and tires. It has a permitted capacity of 1,600 cubic yards with a permitted throughput of 200 tons per day.

Medium volume Transfer/Processing Facility is a facility that receives equal to or more than 60 cubic yards or 15 tons (whichever is greater) of solid waste per operating; or a facility that receives any amount of solid waste, up to 100 tons per operating day, for the purpose of processing solid waste prior to transferring the waste to another solid waste operation or facility.

Trail's End Transfer Station (SWIS # 36-AA-0377): This facility, located on 2 acres on Malibu Trail in the unincorporated community of Morongo Valley, is a medium volume transfer/processing facility. The facility accepts mixed municipal waste and has a permitted capacity of 120 cubic yards per day, and a permitted throughput of 95 tons per day.

In addition to the landfills owned by San Bernardino County, there are several other permitted solid waste facilities located within the plan boundaries. Some of these are owned and operated by private industrial plants for disposal of waste related to their operations. Table 3-56 lists these facilities:

Table 3-56
Private Industrial Solid Waste Disposal Sites in San Bernardino County

FACILITY & LOCATION	PERMITTED ACTIVITY	WASTE TYPES	ACRES	CAPACITY/ THROUGHPUT (C/T)
Ace Plant Dump Site Mariposa Street, Trona	Solid Waste Landfill	Ash	65	T: 198 tons per day
Argus Ash Disposal Site 700 Ft. N of First St. Trona	Solid Waste Landfill	Ash	77	C /T: 250 tons per day
Mitsubishi Cements Plant Cushenbury L.F. Highway 18, Lucerne Valley	Solid Waste Landfill (Class III)	Industrial	15	C: 520,400 cubic yards T: 40 tons per day
Oro Grande Kiln Waste Dust Dump NE of Oro Grande	Inert Waste Disposal Site (Class II)	Other designated	104	T: 233 tons per month

There is also a privately owned and operated large volume transfer/processing facility, waste tire facility and materials recovery facility, located within the City of Hesperia and serving the residents of that area, and solid waste facilities located at Fort Irwin. The Mojave Desert and Mountain Solid Waste Authority owns a transfer/processing facility in the City of Victorville. Additional information regarding these facilities is as follows:

Advance Disposal Transfer/Processing Facility (SWIS # 36-AA-0337): This facility, located on 7 acres on Mesa Street in the City of Hesperia, is owned and operated by Advance Disposal Company. This company handles waste disposal for the City of Hesperia. The site is permitted as a large volume transfer/processing facility, waste tire location and materials recovery facility. Permitted capacity and throughput for the transfer/processing facility is 600 tons per day.

Fort Irwin Sanitary Landfill (SWIS # 36-AA-0068 & 0413): This facility is owned and operated by US Dept. of the Army at Fort Irwin. It is a class III solid waste landfill with a permitted capacity of 19,000,000 cubic yards and a permitted throughput of 100 tons per day. The site has 460 acres identified for disposal, and a remaining capacity, as of May 30, 2001, of 14,738,5900 cubic yards. There is also a composting facility permitted on 6 acres for the composing of green materials and sludge (biosolids). The composting facility is permitted for 18,000 cubic yards per day.

Victor Valley MRF and Transfer Station: This facility is located on 13 acres in the City of Victorville, at the northwest corner of Abbey Land and "B" Street. It is owned by the Mojave Desert and Mountain Solid Waste Authority and operated by Burrtec Waste Industries, Inc. It is permitted as a large volume transfer/processing facility with a permitted capacity of 500 tons per day and a permitted throughput of 600 tons per day.

3.5 MOTORIZED VEHICLE ACCESS NETWORK

3.5.1 Policies and Legislation

3.5.1.1 Federal Land Policy and Management Act (FLPMA)

The Federal Land Policy and Management Act (FLPMA), of 1976, long considered the landmark legislation that changed the operations of BLM forever, provides a multiple use framework for managing the nation's public lands that focuses on the needs of both present and future generations. Under FLPMA, land managers are required to take into account the long term needs of present and future generations as they make important decisions in the management of renewable and nonrenewable resources, including recreation, timber, minerals, watershed, fish, wildlife, rangeland, scientific and historical values. The Act requires BLM to execute its management powers under a land use planning process that is based on multiple use and sustained yield principles.

The BLM is an agency of the U.S. Department of the Interior with responsibility for managing more than 264 million surface acres of America's public lands, and also administers 700 million acres of sub-surface mineral estate throughout the nation. The BLM accomplishes this by planning and managing such resources as outdoor recreation, livestock grazing and mineral development, and by conserving natural, historical, cultural, and other resources on the public lands. Most of the public lands managed by BLM are located in 12 Western states, which includes California. The 25-million-acre California Desert Conservation Area contains over 12 million acres of public lands, which BLM manages.

3.5.1.2 Executive Order No. 11644

In 1971, Presidential Executive Order No. 11644 established the first uniform policies regarding OHV use on public lands. Each land management agency was directed by this Order to issue directions as to which trails and areas were open for OHV use and which were not. The Order required that OHV use be monitored to assess and minimize associated impacts.

3.5.1.3 Federal Regulations (43 CFR 8342.1)

The CDCA Plan's motorized-vehicle access element was amended (1982 Plan Amendment Three, approved May 17, 1983) to conform with 43 CFR 8342.1 which requires route approval to be based on the following criteria:

- Areas and trails would be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
- Areas and trails would be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention would be given to protect endangered or threatened species and their habitats.
- Areas and trails would be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
- Areas and trails would not be located in officially designated wilderness areas or primitive areas.
- Areas and trails would be located in natural areas only if the authorized officer determines that vehicle use in such locations would not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

3.5.1.4 California Desert Conservation Area Plan

Section 601 of FLPMA was included by Congress to give direction about the California Desert Conservation Area. In section 601, Congress required the preparation of a comprehensive, long-range plan for the CDCA. The purpose of the CDCA Plan is to establish guidance for the management of the public lands located in the California Desert by BLM in clear accordance with the Congressional intent as stated in the law.

Goals of CDCA Plan: The goals stated in the CDCA Plan's Motorized-Vehicle Access Element follow:

- Provide for constrained motorized vehicle access in a manner that balances the needs of all desert users, private landowners, and other public agencies.
- When designating or amending areas or routes for motorized vehicle access, to the degree possible, avoid adverse impacts to desert resources.
- Use maps, signs, and published information to communicate the motorized vehicle access situation to desert users, making sure all information materials are understandable and easy to follow.

The goals in the CDCA Plan's Recreation Element follow:

- Provide for a wide range of quality recreation opportunities and experiences, emphasizing dispersed undeveloped use.
- Provide a minimum of recreation facilities. Those facilities should emphasize resource protection and visitor safety.
- Manage recreation use to minimize user conflicts, provide a safe recreation environment, and protect desert resources.
- Emphasize the use of public information and education techniques to increase public awareness, enjoyment, and sensitivity to desert resources.
- Adjust management approach to accommodate changing visitor use patterns and preferences.
- Encourage the use and enjoyment of desert recreation opportunities by special populations, and provide facilities to meet the needs of those groups.

The goals for motorized-vehicle access / routes of travel designations / recreation are to:

- Designate routes of travel consistent with the criteria at 43 CFR 8342.1, discussed below.
- Provide for competitive off-highway vehicle events in a manner that protects desert resources.
- Establish stopping, parking, and vehicle camping limitations consistently.

The CDCA Plan defined open and closed routes as follows:

- Open Route. Access on the route by motorized vehicles is allowed. Specific uses with potential for resource damage or significant conflict with other use may require specific authorization.

- Closed Route. Access on route by motorized vehicles is prohibited except for: (1) fire, military, emergency or law enforcement vehicles when used for emergency purposes; (2) combat or combat support vehicles when used for national defense purposes: (3) vehicles used for official purposes by employees, agents, or designated representatives of the federal government or one of its contractors. Use must be consistent with the multiple use guidelines for that area.

Route designations apply only to routes and portions thereof on public lands; the designation of routes as "open," and "closed" is not applicable on non-public lands.

3.5.1.5 Route Designation Definitions

Route designation definitions of open and closed routes were established in the amended CDCA plan. The definitions are shown here as an aid to the reader.

- Open Route. Access on the route by motorized vehicles is allowed. Specific uses with potential for resource damage or significant conflict with other use may require specific authorization.
- Closed Route. Access on route by motorized vehicles is prohibited except for: (1) fire, military, emergency or law enforcement vehicles when used for emergency purposes; (2) combat or combat support vehicles when used for national defense purposes: (3) vehicles used for official purposes by employees, agents, or designated representatives of the federal government or one of its contractors. Use must be consistent with the multiple use guidelines for that area.

In determining route designations, the following must be kept in mind:

- Route designations approved through the WEMO Plan constitute CDCA Plan decisions; future changes to these decisions would require amending the CDCA Plan.

Route designations apply only to routes and portions thereof on public lands; the designation of routes as "open," and "closed" is not applicable on non-public lands.

3.5.2 Motorized Vehicle Access

There is a close relationship between the pursuit of recreational activities and motorized-vehicle use in the California desert, whether motorized vehicles are driven for pleasure or are simply a means of access to recreation destinations such as campgrounds and wilderness trailheads. Given the desert's vast expanse and great distances to recreation sites, it is difficult, if not impossible, in many circumstances, to engage in recreational activities in this region without employing a motorized vehicle in some fashion. Therefore, actions that restrict vehicular access may affect opportunities for recreation depending on the specific activity pursued and/or the specific location at which such restrictions are imposed. Routes of travel designations directly influence opportunities for recreation and affect access for non-recreational pursuits. Accordingly, motorized-vehicle access, routes of travel designations, and recreation are addressed as a single issue.

3.5.2.1 Motorized Vehicle Access Needs

Motorized vehicle access to public lands in the planning area is needed for a variety of activities. These include OHV touring, motorcycle events (e.g., challenges, speed, and other competitive events), trailheads and staging areas (for hiking, camping, equestrian riding, gem collecting and rock hounding, hunting, etc.), private land access, utility maintenance, and mineral production.

OHV Recreational Touring: OHV touring often occurs on flat terrain, but such touring also takes place in mountainous terrain using jeeps and similar vehicles. Vehicles that allow for multi-terrain travel have a broad range of access needs since they can traverse different types of terrain features.

Motorcycle Events: OHV access is necessary, not only due to the distance that must be traveled to reach the site of a motorcycle speed, challenge, or other competitive event occurs, but also because significant equipment and supplies must be brought to event staging areas. This is true even for dual sport motorcycles, despite their "street legal" status, because a larger OHV may still be necessary to transport related equipment and supplies to motorcycle parks, other staging areas, or trailheads. This is due largely to the distance that such recreationists travel to participate in their activity, and the motorcycle's limited carrying capacity.

Camping and Hiking: Visitors need OHV access to staging areas and trailheads, and must bring supplies to camp in the Desert areas. Campers generally stay at locations that are fairly remote to obtain the level of solitude that is associated with the camping experience. In the desert, these locations are typically not located along major highways. Hikers use OHVs to reach trailheads and staging areas that are often quite remote.

Equestrian Riding: Equestrians use motorized vehicles to pull their horse trailers, and other equipment and supplies, to staging areas where they unload their horses, saddle up, and otherwise prepare for rides. Without the use of OHVs, equestrians would be unable to reach these staging areas, where watering holes, corals, and related facilities are commonly present.

Gem Collecting and Rock Hounding: This activity generally occurs in geologic areas that offer the possibility of finding desired gems and rocks. Many of these areas are remote, and a four-wheel-drive OHV is needed to access them. The vehicle is also required to bring the variety of supplies necessary to safely participate in this form of recreation.

Hunting: Hunters require OHV access to reach trailheads and staging areas, which tend to be remote. From here, they can set out to hunt. Hunters use motorized vehicles to carry their supplies and equipment, which may include camping gear.

Private Land Access: Private lands may be surrounded by public lands, or abut public land in a checkerboard type fashion. The surrounding public lands may lack major highways, and have rough terrain on which street vehicles cannot travel. Four-wheel-drive OHVs are required to access these private inholdings.

Utility Maintenance: Many powerlines, pipelines and fiberoptic cables cross the desert; microwave and other sites are located on public lands. Although many of these sites are not in extremely mountainous terrain, they may not be accessible by major paved highways. Access using unpaved desert routes may be necessary to allow routine maintenance of these facilities to occur.

Mining Production and Exploration: Many mineral production sites cannot be accessed by paved road, and the terrain where they are located may be rather rough. Motorized vehicles may be necessary, however, both to haul supplies and equipment in, and to bring minerals out.

3.5.2.2 Off Road Vehicle Designations Prior to 2002

Off-road vehicle designations have been completed by BLM in the West Mojave planning area, although they have not yet been adopted as a component of the CDCA Plan. These designations occurred through a West Mojave-wide effort in the middle 1980s, during the preparation of ACEC plans, and during a late 1990s pilot project at Ord Mountain, and identified 3,266 miles of open routes within the planning area.

1985-87 Off-Road Vehicle Designations: BLM conducted a field and map inventory of off highway vehicle routes throughout the planning area in the mid-1980s and, based upon that inventory, identified a network of open motorized vehicle access routes. BLM personnel inventoried and evaluated existing routes of travel. Information from existing maps and aerial photos was supplemented by field checks. This information was then utilized to create a known route inventory that primarily consisted of known "two-track" routes (i.e. "single-track" motorcycle routes were generally not part of the inventory). Public meetings were conducted and members of the public also reviewed these route inventories. Criteria for determining which routes were to remain open was based upon public access needs, recreational values and resource conflicts. Following public meetings, decisions to designate the route network were announced.

On August 21, 1985, BLM published a Notice in the Federal Register titled *Off-Road Vehicle Designation Decisions; Ridgecrest Resource Area, CA* (Federal Register, Vol. 50, No.182). Two years later, on June 19, 1987, BLM published Federal Register notice titled *Off-Road Vehicle Route Designation Decisions for the California Desert District, Barstow Resource Area* (Federal Register, Vol. 52, No.118, p.23364); and, on September 22, 1987 BLM publishes a Federal Register notice titled *Off-Road Vehicle Route Designation Decisions for the California Desert District, Barstow Resource Area* (Federal Register, Vol. 52, No. 183, p. 35589). These notices opened 2,949 miles of off highway vehicle routes.

Other Off Road Vehicle Designations: Since 1980, many BLM ACEC and other local management plans identified identified motorized vehicle access networks, collectively identifying 317 miles of open routes. Table 3-57 lists these plans, together with the date the route network in each was developed.

Table 3-57
ACEC Route Networks and Principal Recreation Activities

ACEC NAME AND NUMBER	SIZE ACRES	ROUTE DESIGNATION YEAR	ROUTE STATUS	PRINCIPAL RECREATION ACTIVITIES
Afton Canyon (43)	4,726	1989	26 mile designated route system	Camping, vehicular touring, equestrian, rock hounding, recreational mining on outside edges of area.
Amboy Crater National Natural Landmark (87)	679	NA	One access route to parking area.	Geologic exploration, rock hounding
Barstow Woolly Sunflower (36)	314	1982	Mapped routes excluded; vehicles Excluded From NW ¼ of Section 11; T11N; R6W	Non-vehicular dependent: Hiking, botanizing
Bedrock Springs (24)	785	1987	Mapped designated route system	Access to prehistoric values and Northern portion of the Golden Valley Wilderness Area
Big Morongo Canyon (50)	28,274	1982 1996	Mapped designated route system; Routes designated in 2002 Coachella Valley Plan Amendment	Hiking, wildlife viewing, picnicking
Black Mountain (35)	61,806	1988	26-mile designated route system	OHV recreation and touring, equestrian riding, hiking, camping, prehistoric and historic interpretation, recreational mining on northeastern fringe of area, wilderness recreation.
Calico Early Man Site (40)	898	1984	Mapped designated route system	OHV touring, hiking, camping, prehistoric and historic interpretation
Christmas Canyon (23)	3,444	NA	No route designation because most of ACEC is within Open area	OHV recreation and touring, historic interpretation. Located in between Spangler Hills OHV area and China Lake Naval Weapons Center.
Cronese Basin	10,226	1984	Mapped designated route system	OHV touring, bird-watching, wildlife viewing
Desert Tortoise Research Natural Area (22)	25,695	1988	Designated closed to vehicular use; protected by perimeter fence	Hiking, wildlife viewing, shooting.
Fossil Falls (10)	1,667	1986	Designated route system	OHV touring, prehistoric appreciation. Located at north end of East Sierra subregion.
Great Falls Basin (12)	9,726	1987	Mapped designated route system	OHV touring, picnicking, bird-watching, wildlife viewing. Located just north of Trona.

ACEC NAME AND NUMBER	SIZE ACRES	ROUTE DESIGNATION YEAR	ROUTE STATUS	PRINCIPAL RECREATION ACTIVITIES
Harper Dry Lake (37)	475	1982	Mapped designated route system; all routes within 100 yards of marsh vegetation closed	OHV touring, bird-watching, equestrian riding. Located southwest of Black Mountain Wilderness Area.
Jawbone/Butterbread (20)	187,486	1982	133 mile designated route system	OHV touring, bird-watching, wildlife watching, rock-climbing. Located south of East Sierra subregion.
Juniper Flats (45)	2,528	1988	Mapped designated route system	Equestrian riding, OHV recreation and touring, access to Deep Creek hot springs. Located north of San Bernardino Mountains.
Last Chance Canyon (21)	5,913	1982	Designated route system	OHV recreation and touring, historic appreciation, wildlife viewing. Located south of El Paso Mountains Wilderness Area.
Manix (85)	2,897	NA	None	Paleontological and historic interpretation, OHV touring. Located south of Coyote subregion.
Mojave Fishhook Cactus (77)	628	1990	Designated route system	OHV touring, botanizing
Rainbow Basin (39)	4,087	1991	30 mile designated route system	Camping, OHV touring, equestrian riding, hiking, geologic, paleontological and prehistoric interpretation. Located in middle of Superior subregion.
Red Mountain Spring (formerly Squaw Spring) (26)	717	1987	Mapped designated route system; area closed to vehicular travel	Prehistoric and historic interpretation. Located in northern portion of Red Mountain subregion.
Rodman Mountains Cultural Area (84)	6,204		Routes outside Rodman Mtns. Wilderness were designated as part of Ord-Rodman Plan	OHV touring and recreation, cultural interpretation, hiking, wilderness recreation.
Rose Springs (7)	859	1985	Routes designated closed	Hiking, wildlife viewing, prehistoric interpretation, hunting. Located in north end of East Sierra subregion.
Sand Canyon (11)	2,609	1989	Specific route closures	Hiking, wildlife viewing, bird-watching, hunting, cultural interpretation. Located - in part- in central East Sierra subregion.

ACEC NAME AND NUMBER	SIZE ACRES	ROUTE DESIGNATION YEAR	ROUTE STATUS	PRINCIPAL RECREATION ACTIVITIES
Short Canyon (81)	754	1990?	Most of the ACEC routes are closed because they are within wilderness	Hiking, botanizing, wildlife viewing, bird-watching, hunting. Located in East Sierra subregion, borders Owens Peak Wilderness.
Soggy Dry Lake Creosote Rings (47)	186	1982	All vehicular routes closed to protect unique vegetation	Botanizing, hiking. Located just south of Johnson Valley OHV area.
Steam Well (25)	41	1982	Designated route system; All routes closed with inclusion of ACEC in the Golden Valley Wilderness Area	Prehistoric and historic interpretation. Locate din southwest edge of Golden Valley Wilderness area.
Trona Pinnacles (16)	4,055	1989	Designated route system	Sightseeing, commercial filming, OHV touring, geologic interpretation. Located in South Searles subregion.
Upper Johnson Valley Yucca Rings (46)	353	1982	Specific routes designated closed	Botanizing, OHV recreation and touring. Locate din Johnson Valley OHV area.
Western Rand Mountains (2)	17,877	1994	128 mile designated route system	OHV touring and recreation. Applied to ACEC and surrounding lands.
Whitewater Canyon (49)	16,381	1982	Designated route system	OHV touring, wildlife viewing, hiking

Ord Mountain Pilot Off Road Vehicle Designations: In 1995 the BLM undertook a pilot project within the Ord Mountain area to test methods to acquire an inventory of routes of travel. A pilot digital aerial photograph was used together with GIS digitizing equipment to identify 549 miles of existing routes of travel in the area. From this inventory, a proposed open route system was identified by BLM and addressed in an environmental assessment.

3.5.2.3 OHV Route Subregions and BLM 2001-2 Route Inventory

Twenty-one "subregions" have been identified for route designation planning purposes. Table 3-58 describes each of these subregions, as well as the recreational activities and access needs associated with each subregion, the miles designated open by BLM in 1985 and 1987 and, where applicable, the miles of routes inventoried by BLM in 2001-2. A more detailed narrative discussion can be found in Appendix R, section R.2.

Table 3-58
Off Road Vehicle Designation Subregions

SUB REGION	PRINCIPAL RECREATION ACTIVITIES	ROUTE MILEAGE		COMMENTS
		DESIGNATED OPEN: 1985-87	2001 ROUTE INVENTORY	
Amboy	Off-highway touring, rock-hounding, recreational mining		N/A	Need to maintain commercial access to America Mine and other mine claims, recreation access to the Amboy Crater ACEC and military access to the Marine Corps Air Ground Combat Center.
Bighorn	Off-highway touring, sightseeing, equestrian riding.	218	N/A	Contains Bighorn Mountain Wilderness; provides access to San Bernardino National Forest. Transition area of desert valley floor into the mountains.
Coyote	Rock hounding, off-highway touring/ sightseeing, mining.	178	411	Calico Early Man Archaeological Site, Cronese Lakes ACEC, and Soda Mountains Wilderness Study Area. OHV recreation relatively light. Most OHV activity occurs in southwestern sectors.
East Sierra	Hiking, camping, rock hounding, OHV, equestrian.	109	N/A	OHV touring allows hunting, wildlife observation, and equestrian staging. Area important for access to remote backcountry activities.
El Mirage	OHV, recreational mining	49	267	El Mirage OHV recreation area borders sub region to the south. Area of more historic use than current use. Once more popular for races which have since shifted to the Open Areas. Edwards bowl in the western sector popular as a motorcycle area creates some conflicts with adjoining private property owners. Shadow Mountain once very popular with motorcyclists. Use now restricted due to conflicts with hamlet of Shadow Mountain to the south. Bajadas north of Shadow Mountain have been found to have higher than average desert tortoise sign.
El Paso	OHV use, rock hounding, shooting/hunting.	324	465	Last Chance Canyon ACEC and El Paso Mountains Wilderness abut the sub region. Very mountainous area universally popular for a variety of visitor types including jeepers, motorcyclists, miners, campers, rock hounders, equestrians, historical explorers and upland game hunters
Fremont	OHV use, shooting/ hunting, rock hounding, equestrian riding, hiking, recreational mining.	214	582	Contains Barstow Woolly Sunflower ACEC, Harper Dry Lake ACEC, and the Black Mountain Wilderness. Northern hilly sectors very popular longstanding MC area; Gravel Hills and Hamburger Mill northwest of Fremont Peak known for long-term historical use. Bajada areas in the southern sectors not nearly as popular as the above-described areas to the north. Bajadas areas in the south and central sector known for historically high populations of desert tortoise.
Granite	OHV touring, recreational mining, rock climbing, hiking, dispersed camping, day use.	38	N/A	Stoddard Valley OHV Area borders sub region to the north. Fairview area in southern portion of region receives moderate to high dispersed, day use including hiking, rock climbing, and social gatherings.
Juniper	Equestrian riding, recreational mining, hiking, MC riding, hunting	108	N/A	Hunting opportunities are found in the Juniper Flats area as well as on national forest lands. Visitors can camp at Bowen Ranch area and at locations throughout the national forest, to the south. OHV touring allowed in appropriate areas.
Kramer	OHV use/dual sport, rock hounding, shooting/ hunting	254	642	Mining and homestead site established in the late 19th and early 20th century exists in the area, some of which may have historical significance.

SUB REGION	PRINCIPAL RECREATION ACTIVITIES	ROUTE MILEAGE		COMMENTS
		DESIGNATED OPEN: 1985-87	2001 ROUTE INVENTORY	
Middle Knob	OHV touring/ sightseeing, camping, hiking, hunting	N/A	91	Cultural resources are significant in the sub region. Contains biological values of special concern, including habitat for desert tortoises.
Morongo	Wildlife viewing education, hiking	18	N/A	The Big Morongo Canyon Preserve, a wildlife refuge, is located - in part - within the sub region
Newberry-Rodman	Equestrian, OHV touring, sightseeing, dual sport, rock hounding, mining	142	210	Sub region contains the Newberry Mountains Wilderness, the Rodman Mountains Wilderness and the adjoining Rodman Mountains ACEC. Rock art and cultural sites are within the sub region.
North Searles	OHV use/dual sport, rock hounding, equestrian rides.	99	N/A	Shooting/hunting occur in the Argus Range Wilderness that borders the northwestern portion of the subregion. The Great Falls Basin/Argus Range ACEC lies within the sub region.
Ord	Recreational mining, OHV touring/ sightseeing	38	549	The historic Ord Mountain Road and the Daggett Wash Road are accessible by four-wheel drive vehicles and motorcycles (OHV/dual sport). The Stoddard Valley OHV Recreation Area to the west and the Johnson Valley OHV area to the southeast of the sub region provide for OHV/dual sport activities.
Pinto	Rock hounding, OHV touring/ sightseeing, mining			The sub region is bordered by the Joshua Tree National Park to the east, west, and the south.
Red Mountain	OHV touring/ sightseeing, shooting hunting, OHV/ dual sport, hiking, equestrian riding, mining.	234	733	The Grass Valley Wilderness is partly contained in the sub region and the Golden Valley Wilderness borders the sub region to the north. These bajadas areas in the central west sector west of Cuddeback Lake, are known for historically high populations of desert tortoise and extremely high historical mining activity.
Ridgecrest	Hiking, equestrian OHV/dual sport	106	328	The Rademacher Hills trails open to the hiking, jogging, horseback riding and mountain biking.
Sleeping Beauty	Rock hounding, recreational mining.	58	N/A	Historic Route 66 borders the sub region to the south.
South Searles	Rock hounding, shooting, OHV touring/sightseeing, mining.	36	N/A	Sub region contains the Trona Pinnacles National Natural Landmark ACEC. Historical and cultural resources are located in the sub region.
Superior	OHV/dual sport, rock hounding, camping, mining.	396	668	Contains the Rainbow Basin National Natural Landmark ACEC. The Black Mountain Wilderness lies to the west of the sub region and the Calico Mountains lie to the south east of the sub region.

3.6 ENERGY PRODUCTION AND TRANSMISSION

3.6.1 Powerlines, Pipelines and Fiberoptic Cables

CDCA Plan Utility Corridor Network: The CDCA Plan, as amended, established a network of sixteen utility planning corridors across the Mojave and Colorado Deserts. All new linear utilities exceeding the following thresholds must be located within a utility corridor:

- New electrical transmission towers and cables of 161 kV (kilovolts) or above;
- All pipelines with diameters greater than 12 inches;
- Coaxial cables for interstate communications; and,
- Major aqueducts or canals for interbasin transfers of water.

Seven of these corridors cross the planning area: Corridors A, B, BB, C, D, G, and H. Each corridor is between two and five miles wide. The intent of the corridors is to provide a delivery system network that meets public needs in a manner that minimizes the proliferation of widely separated rights of way by encouraging the joint use of corridors for utilities. By locating a project within a corridor a project proponent does not receive immediate approval to construct a project: a federal right of way grant must still be obtained and a NEPA document prepared.

Occasionally the unique needs of a project may require that it be located outside of a corridor. To accommodate these situations, several "contingent" corridors were identified by the CDCA plan that could be activated through a CDCA plan amendment. A project could be located outside of either an activated or contingent corridor, but only through a CDCA plan amendment that examined whether the need for a one-time exemption from the corridor network warranted construction in a non-corridor location. This has happened only once since the CDCA plan was adopted, for the All American Pipeline in 1983, in a region outside of the western Mojave Desert.

Utility Biological Opinions: Table 3-59 presents the abbreviated terms and conditions found in 10 biological opinions addressing utility projects. Table 3-60 presents the take authorized by those opinions (mortality, harassment, and acreage where provided). These include includes **5 pipelines** (2 crude oil, 1 gasoline, 1 natural gas), **3 transmission lines**, and **2 fiber optic cables**. They include only those biological opinions that had a mortality and/or harassment take limit specified for maintenance activities. Appendix Q presents a more detailed summary of the terms and conditions found in the biological opinions.

Although maintenance was the primary focus of the tables, the terms and conditions of the biological opinions also apply to other activities, including construction and installation, operations, routine inspections, repair, and responses to emergency situations.

Table 3-59
Prevalence of Terms and Conditions for 10 Linear Projects

TERMS AND CONDITIONS	NUMBER OF PROJECTS WITH THIS TERM AND CONDITION
Education	10
Flag boundaries, restrict activities to impact area	10
Tortoise preconstruction surveys	10
Biological monitor required	10
Speed limits (4 at 20 mph, 2 at 25, 1 at 10)	6
Litter free workplace	8
Project-end reporting	6
Unauthorized firearms prohibited	7
Use existing roads	6
Check under vehicle for tortoise	6
Designate Field Contact Representative	6
Avoid entrapping tortoises in excavations	6
No pets in the construction area	5
Revegetation required	8
Compensate impacts with fees or acquisition	4
Raven prevention measures	2

Table 3-60
Authorized Mortality and Harassment Take for 10 Linear Projects

IMPACTING ACTIVITY	AUTHORIZED MORTALITY	AUTHORIZED HARRASMENT
Maintenance and/or Repair	6 per year	8 per year
Maintenance and/or Repair	15	2 unlimited
Construction	8	125
Construction and Maintenance	6	20
Routine Inspections, Emergencies	5	---

3.6.2 Energy Generation Plants

Energy generation plants are currently located within or in close proximity to the West Mojave Plan. Table 3-61 provides data regarding the megawatts (MW) of electricity generated by these plants.

Table 3-61
West Mojave Energy Generation [35]

FACILITY TYPE	ONLINE MEGAWATTS	NO. OF PERMITTED FACILITIES
Biomass	.25	1
Coal	177	3
Geothermal	240	3
Hydroelectric	39	2
Natural Gas	738	6
Solar	409	9
Wind	701	45

Electricity demand increased 16% in the SCAG region during the 1990's, and is projected to continue to grow at about 2% per year. This increasing demand for electrical energy will result in continued efforts to conserve and develop new energy sources in California. The reliability of the energy needed to meet projected demand will depend in part on developing a diversity of energy sources (SCAG- Regional Comprehensive Plan and Guide – Energy Chapter Update 2002). The West Mojave region contains the natural resources to support the development of alternative energy sources such as wind, geothermal and solar facilities, and there will likely be future proposals for the development of these resources as energy demands increase. Proposed thermal energy facilities of 50MW or greater and related facilities (i.e., transmission lines) are subject to the permitting authority of the California Energy Comission (CEC). The Commission's siting process provides:

- Assurance that only power plants actually needed will be built;
- Review by independent staff with technical expertise in public health and safety; environmental sciences, engineering and reliability;
- Simultaneous review and full participation by all state and local agencies, as well as coordination with federal agencies;
- One regulatory permit;
- A decision within a specific time frame; and,
- Full opportunity for participation by public and interest groups. [36]

Thermal energy facilities of less than 50MW on private lands are subject to the permitting authority of the city or county within which the proposed project resides and typically require the issuance of a conditional use permit. On public lands managed by the BLM, new thermal energy facilities (other than geothermal – see below) require a right of way permit per 43

35 Data source: California Energy Commission
36 *Energy Facilities Licensing Process – A Guide to Public Participation.* California Energy Commission Web page at www.energy.ca.gov.

CRF Part 2800. Coordination with the CEC permitting process for facilities of 50MW or greater on public land would also occur.

The Renewable Resource Data Center (RReDC), managed by the Department of Energy's Office of Energy Efficiency and Renewable Energy has identified major wind resource areas throughout the United States that have been estimated to have suitable wind energy potential for wind turbine applications ("Class 3" or greater annual average wind power). Within the planning area the Tehachapi Pass, near Mojave, possesses Class 6 wind energy potential. The western part of the Antelope Valley is another area of high wind resource potential with site data in the extreme west end of the Antelope Valley indicating a Class 6 wind resource. RReDC has estimated Class 3 or higher wind resource over much of the southern and western parts of the Antelope Valley. Another wind corridor exists in the vicinity of Daggett (just east of Barstow) where winds are channeled between the Calico and Rodman Mountains. Site data from the Daggett Airport indicate Class 3 to 4 windpower in this area. For each of these wind resource areas, the maximum wind resource occurs in the spring and summer. [37]

Wind energy development within the plan area is currently concentrated in Kern County near the communities of Techahapi and Mojave. Approximately 700 MW are produced from the wind farms located in this area. In February 2002, the BLM issued a Temporary Use Permit (CACA-43088) to Sea West Wind Power for a term of five years for the placement of five meteorological masts on Daggett Ridge.

The amount of sunlight received at any given location varies greatly depending on geographical location, time of day, season and clouds. The southwestern United States is one of the world's best locations for solar energy production with the desert region receiving almost twice the sunlight as other regions in the United States[38]. Major solar energy facilities have been developed in the Daggett area, at Kramer Junction and at Harper Dry Lake. Online energy production for solar these power plants is approximately 409 MW.

The majority of the coal and natural gas fueled power plants within the study area are cogeneration facilities, the one exception being the Coolwater facility east of Barstow. In May of 2000, the California Energy Commission granted approval to the High Desert Power Plant Project, a new natural gas fueled 750 MW facility. This facility is proposed to be located on a 25-acre site of the Southern California International Airport, formerly George Air Force Base, in the city of Victorville.

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37 *Wind Energy Resource Atlas of the United States*. Renewable Resource Data Center [www.nrel.gov]
38*Solar Energy*. Renewable Resource Data Center [www.nrel.gov]

3.7 CULTURAL RESOURCES

3.7.1 Archaeological, Historical, Paleontological and Ethnographic Resources

3.7.1.1 Area of Effect

Effects to cultural resources would be generated by specific implementing actions, such as fence construction, structure and debris removal, and route designation. Because specific locations for some actions have not yet been identified, it is not possible at this time to fully identify the entire area of potential effect (APE). Decisions that result in actions that disturb the ground surface or items on the surface would define the actual area of potential effect for most cultural resources. For these actions, all work areas, including parking for equipment, loading and unloading areas, would also fall within the APE. In some cases, actions may affect larger areas, such as landscapes that have cultural, traditional, or sacred values. For route designation, which is the action being considered by the West Mojave Plan with greatest potential to affect cultural resources, the area of effect is the actual routes under consideration plus the 600-foot-wide corridor along open routes that is available for pulling off, parking, and camping, plus areas near or adjacent to routes that may be subject to effects related to use of the route. Such effects include access to historic and prehistoric sites in the area that may be subject to vandalism, artifact theft, removal of wood for campfires, and other similar types of effects. In some cases, presence of vehicle access may have effects on traditional landscapes that extend well beyond the route and 600-foot corridor of use.

3.7.1.2 Existing Database

The existing cultural resources database consists of inventory reports, archaeological site records, and related information maintained by BLM in each field office and a database maintained by the State of California Office of Historic Preservation (SOHP). To a large degree these databases overlap through sharing of information over the years. The state database has been maintained by individual Information Centers around the state and until recently was, like the BLM database, a hard copy system of maps, site records, inventory reports, and photographs. For the past several years a cooperative effort between BLM and the SOHP has been underway to digitize the database and make it available to qualified users in an electronic format that would allow more refined manipulation of the data. This electronic system, the California Historical Resources Information System (CHRIS) is still under development. Currently, a static version of data that has been entered into the CHRIS system has been provided to each BLM field office on a compact disk (CD).

In 1966 the National Historic Preservation Act was passed, which requires that federal agencies take into consideration the effects of decisions on cultural resources. By the mid-1970s BLM archaeologists were surveying project areas for Bureau-initiated and non-Bureau-initiated proposed actions. Similar requirements of state law apply to development of private lands. Since then, the overwhelming bulk of archaeological inventory carried out within the planning area has been generated by the need to meet legal compliance requirements. Since location of inventory has been almost wholly determined by where development was planned, the available

data does not fully reflect the nature, location, and significance of the resource on the ground. The primary exception to this is the archaeological inventory carried out during preparation of the California Desert Conservation Area Plan, beginning in 1969 and continuing until the CDCA Plan was signed in 1980. Each planning unit in the California Desert was subject to systematic sample inventory, stratified by various environmental factors that are thought to influence archaeological site distribution. The sample was low, ranging from 0.5% to 2% per planning unit and averaging 1% desert wide. Nevertheless, approximately 280 square miles were systematically inventoried and another 50 square miles were subject to less intensive reconnaissance. A total of 2,903 historic and prehistoric sites were recorded (USDI, BLM 1980, Appendix VII). This effort substantially increased our knowledge of the distribution of historic and prehistoric sites within the California Desert.

3.7.1.3 Regional Overview: Prehistoric

For detailed regional overviews of the prehistory, history, and ethnography of the study area see Norwood *et al.,* 1980, Stickel *et al.* 1980, Hall *et al.* 1981, Garfinkel 1976, Norris and Carrico 1978, and Warren and Roske 1981. These reports were prepared during preparation of the CDCA Plan and summarized available data at that time. More recent overviews may be found in W & S Consultants 2000 and Whitley, Whitley and Simon n.d.

The California Desert has been inhabited for at least 8,000 to 10,000/12,000 years and perhaps longer, although most of the extant remains date to much later periods. Evidence of the earliest occupations is sparse and difficult to date or interpret. Between 8,000 to 12,000 years ago settlement was centered on lakes, which are now the dry playas so characteristic of the Mojave Desert and Great Basin. These lakes, and especially marsh environments along their edges, were particularly rich in plant and animal species that provided food, fibers, medicines, tools, clothing, and ritual objects necessary for daily existence. From 8,000 to 6,000 years ago, climatic change caused the lakes to dry, necessitating cultural adaptation to the loss of a prime habitat. One of the adaptations included increased use of upland areas. (There is evidence that use of upland areas actually began earlier than this while the lakes were still present.) Around 6,000 years ago, food gathering and land use patterns began to appear that continued into the historic period. These involved use of a greater variety of habitats and plant and animal resources. Grinding implements such as manos and metates made their appearance. Around 2,000 years ago a shift in projectile point types from larger forms (e.g. Elko and Gypsum points) to smaller forms (e.g. Rose Spring and Eastgate Points) may indicate the introduction of the bow and arrow to replace spears and atlatls. The expansion of bow-and-arrow technology is indicated by the late prehistoric introduction of Desert Side-Notched and Cottonwood Triangular points, which are found throughout the area. These point styles are key indicators of the age of archaeological sites in which they occur. By this time, because of the drier climate, primary habitation sites were located near reliable water sources such as springs and flowing streams. Secondary habitation sites were established as needed in areas in which particular resources were seasonally collected. Sites relating to ritual or religious activity, such as rock art sites, sometimes occurred near habitation sites but were also remote from such sites to protect the sacred nature of the sites and the ritual activities. People generally followed a pattern of exploitation of seasonally available resources by moving through a more-or-less defined homeland, usually returning to a primary habitation ("village") for winters. This pattern of

seasonal movement from place to place resulted in use of large areas by relatively small populations, and left the remains that are now archaeological sites widely scattered over the landscape.

3.7.1.4 Regional Overview: Historic

The first documented exploration of the Mojave Desert by non-indigenous peoples occurred in the mid-1700s when Francisco Garces, a Spanish Franciscan priest, looked for a practical route from Arizona to northern California. Between Garces' exploration in 1776 and 1880, only agriculture or precious metals attracted Spanish-Mexican and American settlers. Much of the history of the region turns on its use as a corridor (Warren 1980: 195).

In the early 19th century, fur trappers and caravans crossed the desert. Jedediah Smith led the way in 1826, followed by other mountain men like Ewing Young in 1829; both followed the Mojave Indian Trail. Antonio Armijo is credited with leading the first caravan of pack animals across the Mojave in 1830. Traders William Wolfskill and George C. Yount used the Old Spanish Trail in 1830-1831. Other groups who used the trail during Mexican control of the western Mojave include Don Jose Aveita's commercial caravan in 1833-1834, Jacob P. Leese in 1834, William Slover and Isaac Pope in 1837, and Jose Antonio Salazar's caravan in 1839-1840. John C. Fremont, a lieutenant in the U.S. Army Corps of Topographical Engineers, described his survey and travel in 1844 along a variant route (Warren 1980:201). Other trails arising from commerce include the Mojave Trail and Salt Lake Trail, both of which run through present-day Barstow. Joseph Walker is credited with pioneering a trail across the Sierra Nevada Range, enabling access between the San Joaquin Valley and the desert.

Settlement by Americans and the growth of coastal and inland trade culminated in the annexation of California by the United States in 1848. In that same year, gold was discovered in California and the gold rush was on, ushering in a massive influx of prospectors. The Death Valley forty-niners, led by William Lewis Manly, traveled through the project area along Indians Big Trail, also known as Owens River Road, the Midland Trail, and Bullion Road, which connected the northern Mojave and Owens Valley area with Los Angeles, via connections with the Tehachapi Pass road and Walker's Pass road. In the late-19th century, these roads were used to transport goods, people, livestock, food and ore between the Mojave Desert and Los Angeles. Temporary camps or stage stops were set up along the routes, including Indian Wells Station, Coyote Holes Station, and Panamint Station. The western Mojave Desert became a major contributor to California's mining industry. Small mining towns, such as Calico and Coolgardie, and ranching operations were established and proposed.

The California Gold Rush contributed to pressure to establish railroad routes across the desert. Railroad surveys began in 1853 with Lieutenant Amiel Weeks Whipple and Lieutenant Robert Stockton Williamson conducting surveys in the western Mojave. The San Pedro, Los Angeles and Salt Lake Line, predecessor of the Union Pacific through the Mojave Desert, was completed in 1905, and the Tonopah and Tidewater finished its line from Ludlow on the Atlantic & Pacific via Death Valley Junction to Beatty, Nevada in 1907 (Warren 1980:207). Spur lines were constructed to serve mines and mining camps. The Harvey house originated from an early railroad roadhouse located at the junction of the Santa Fe Mojave-Needles line and the California

Southern line coming north from Cajon Pass.

Development of automobile routes began in the early-20th century and increased in importance in the second quarter of the 20th century (Warren 1980:239). Following completion of the Atlantic & Pacific Railroad, a road was constructed in 1914 parallel to the tracks, which road became the precursor of U.S. 66. In 1925, construction began on U.S. 91, a new alignment of an older trail, which opened up the desert to the general public.

Ranching and agricultural industries at the beginning of the 20th century and increasing populations in Los Angeles created a need for more water than the immediate landscape could supply. In rural areas, the demand was met by small irrigation ditches and canals, but Los Angeles' need was met by construction of the Los Angeles Aqueducts in 1908-1913 and in the 1920s.

Military bases were established in the desert prior to U.S. entry into World War II. Large tracts of land were set aside for military use near Ridgecrest, Barstow, Lancaster, and Twentynine Palms.

3.7.1.5 Known Significant Sites

Prehistoric and historic properties and traditional cultural properties on federal lands are formally identified as significant by being listed in the National Register of Historic Places or determined eligible for listing (see Table 3-62). Properties on state or private lands are formally identified as significant by being listed in the California Register of Historic Resources or designated as a California Historic Landmark or California Point of Historical Interest. Some local governments also offer designation/registration programs for local properties. These lists are not comprehensive; they include only those properties that have been selected for special attention or have been evaluated as part of project development. Most sites have not been evaluated for significance. Federal regulation requires that caution be exercised when dealing with unevaluated properties to avoid damage or alterations that might affect qualities that could make them eligible for listing in the National Register of Historic Places.

Table 3-62
West Mojave Sites listed in the National Register of Historic Places

RIDGECREST FIELD OFFICE			
PROPERTY NAME	COUNTY	SITES INCLUDED	KNOWN VALUES
Bandit Rock (Robber's Roost)	Kern	1 (several sites present were not included in nomination)	Historic (sites not included in nomination are prehistoric)
Blackwater Well	Kern	17	Prehistoric
Last Chance Canyon (Includes Last Chance Canyon ACEC within boundaries)	Kern	160 (an additional 55 sites within 2 mile radius of boundary)	Prehistoric/historic/ Native American
Red Mountain Spring Archaeological District	San Bernardino	23 formally recorded; a number of others being documented as a result of recent research	Mostly prehistoric but some historic remains

RIDGECREST FIELD OFFICE			
PROPERTY NAME	COUNTY	SITES INCLUDED	KNOWN VALUES
Fossil Falls Archaeological District (includes part of Fossil Falls ACEC)	Inyo	32	Prehistoric
Steam Well Archaeological District	San Bernardino	4	Prehistoric
BARSTOW FIELD OFFICE			
Fossil Canyon	San Bernardino	SBR2841, SBR2058	Scientific, conservation, traditional use, public
Rodman Mountain Petroglyphs	San Bernardino	SBR307A, B, C (Deep Tank), SBR306A, B, C (Surprise Tank)	Scientific, conservation, traditional use, public
Black Mountain Rock Art District	San Bernardino		Scientific, conservation, traditional use, public
Newberry Cave	San Bernardino		Conservation, traditional use
Harvey House	San Bernardino		Conservation, public; 1911 Railroad station.
Alf's Blacksmith Shop	San Bernardino		Conservation, public; Only known complete blacksmith shop remaining in San Bernardino County.
Lake Mojave	San Bernardino	CA-SBE-140	Scientific

Table 3-63 lists sites of significance on public lands administered by the BLM Barstow Field Office.

Table 3-63
West Mojave Sites of Significance Administered by BLM Barstow Field Office

NAME	CULTURAL RESOURCE VALUES
CA-SBR-1606	Scientific
CA-SBR-2081	Scientific
CA-SBR-2085	Scientific
CA-SBR-2094	Scientific
Pinto Basin	Scientific
Salt Springs	Scientific
Amargosa Canyon	Scientific, conservation, public
Awl	Scientific
Rock Spring	Scientific, public
Saratoga Springs	Scientific
Oro Grande	Scientific
Rustler Rockshelter	Scientific
Deep Creek	Scientific
China Ranch	Scientific
Shoshone Rockshelter	Scientific
Fort (Camp) Cady	Scientific, conservation, public; 1860 military fort built by Major James H. Carleton.
Deadmans Point	Public

NAME	CULTURAL RESOURCE VALUES
Finger Rock (Hercules' Finger)	Public; site of 1840 battle between ranchers and rustlers.
Black Canyon	Scientific, conservation, traditional use, public
Calico Ghost Town/Mining District	Public; silver mining district
Coolgardie Camp	Public; 1890s gold mining camp.
Inscription Canyon	Scientific, conservation, traditional use; public

A number of other sites/districts are currently being nominated for listing in the National Register and many sites have been determined to be eligible for listing in the National Register.

Table 3-64 describes the areas of critical environmental concern that have been designated within the West Mojave planning area.

Most archaeological sites have not been evaluated for their significance or eligibility for listing in any formal roster of significant sites. Because one of the criteria for determining whether or not a site may be eligible for listing in the National Register is that the site has "yielded, or may be likely to yield, information important in prehistory or history" (36 CFR 60) many site types are *a priori* eligible for listing and are treated as such for management purposes regardless of whether or not formal determinations have been made. Such site types include permanent or semi-permanent habitation sites ("villages"); temporary camps containing multiple tool types, especially if they contain obsidian; and utilized shelters or caves that contain the same types of materials. As analytical techniques improve or new technologies are perfected, the kinds of data that can be extracted from archaeological materials increase. In contrast to most archaeological sites, which generally provide information on aspects of material culture and relationships between sites and groups of people, sites containing rock art (petroglyphs and pictographs) can provide glimpses into the intellectual and spiritual aspects of culture.

Historic sites may yield information on industrial technologies and how they were used or adapted in individual situations; ethnic, gender and age make-up of working populations; food preferences; availability of luxury items to various groups; and even how speculation on Wall Street affected small mining operations in the western United States (Barnes 2001).

All of this means that many, many archaeological sites, both recorded and unrecorded, are likely to be found to be significant and eligible for listing in the National Register of Historic Places if formally evaluated. For these reasons the actual number of sites listed in the National Register is not an accurate indicator of the significance of the resource base as a whole

3.7.1.6 Potentially Significant Areas

All of the lands within the planning area that are administered by the BLM's Ridgecrest Field Office may be characterized as sensitive for cultural resources with a few exceptions. Reasons for the intensity of prehistoric occupation include the presence in the past of a series of Pleistocene lakes and the Owens River as well as the fact that this area is on the boundary between the Mojave Desert and the Great Basin and presents a greater than usual variety of environments and associated natural resources.

Table 3-64
Cultural Resource ACECs in Western Mojave Desert

RIDGECREST FIELD OFFICE	
ACEC	CULTURAL RESOURCE VALUES
Rose Spring	Contains several prehistoric sites. Research at these sites started in the 1950s and continues (Lanning 1963, Riddell 1956). These sites are type sites for cultural chronology of the western Great Basin.
Fossil Falls	Large complex of prehistoric sites associated with Pleistocene Owens River, 32 of which are listed in the National Register. Research here dates back to work of M.R. Harrington in the 1950s. Area includes the Stahl site, on private land, also an important type site for explication of western Great Basin/Northern Mojave cultural chronology.
Last Chance Canyon	Prehistoric. Part of the Last Chance Canyon National Register District; the portion of the District considered to be most at risk was selected for ACEC status. Also includes important historic resources.
Jawbone-Butterbredt	Native American values. Contains a number of locations that were identified by a Kawaiisu elder whose family had lived in the area, including prehistoric and proto-historic/historic archaeological sites, sacred areas, and areas that were known or thought to contain burials.
Christmas Canyon	Prehistoric. Subject of current research that is revealing a large and very significant complex of sites, including examples of rare cultural phenomena. Some sites are related to various stands of Pleistocene Lake Searles and preliminary dates indicate great age for some of them, while at least one site contains historic materials, indicating a very long period of use.
Bedrock Spring	Prehistoric. Subject to current research by BLM, this ACEC also contains a variety of site types including habitation sites, rock shelters, rock art, milling, and others. Publication of current research will add materially to our understanding of prehistory in this portion of the Mojave Desert.
Steam Well	Prehistoric. Contains four petroglyph sites
Red Mountain Spring	Prehistoric. Contains 23 recorded sites and other sites that have been located during recent research by Cal Poly Pomona archaeologists. Site types include habitation sites, lithic scatters, milling features, rock art, trails, stacked stone structures, and hunting blinds. Although the ACEC was designated for prehistoric resources there are also historic materials within the ACEC.
BARSTOW FIELD OFFICE	
Afton Canyon	Moderate density and complexity of sites. Twenty recorded prehistoric sites, including quarries, lithic scatters with ground stone, and occupation/multi-use sites. Represent riparian and lacustrine resource exploitation, tool manufacture, trade, and desert settlement (Bureau of Land Management 1989:38). Scientific use.
Calico Early Man Site	Lithic tools and debitage are associated with possibly the earliest human occupation on the North American continent. Continued research investigates human occupation and settlement of the Western Hemisphere (Bureau of Land Management 1984:2.1). Public use.
Black Mountain	Area contains the most extensive assemblages of prehistoric petroglyphs within California. Quarry and lithic workshops are found within the ACEC as well as evidence for obsidian trade (Bureau of Land Management 1988:6). Scientific, traditional use.
Cronese Lakes	This area contains sites representing occupation beginning 8,000 years ago. Cultural remains provide information regarding subsistence and settlement patterns in the Great Basin (Bureau of Land Management 1985:1-5). Scientific use.
Denning Spring	Cultural resource values include at least four major resource locations. In addition to historic resources not formally recorded, prehistoric sites are designated SBR3828 and SBR 3829B and 3829C (Bureau of Land Management 1982:3). Scientific use.
Greenwater Canyon	Contains multi-purpose sites indicative of occupation beginning about 12,000 years ago to historic contact. Sites include rockshelters, petroglyphs, pictographs, hunting blinds, and diagnostic lithic tools (Bureau of Land Management 1988:6-10). Scientific, traditional, public use.

ACEC	CULTURAL RESOURCE VALUES
Juniper Flats	Numerous sites have open trash middens, evidence of cooking, tool manufacture, hunting, and plant/animal processing. An occupied rockshelter is also present. Early historic remains are related to homesteading and mining (Bureau of Land Management 1988:9). Scientific use.
Rodman Mountains	
Rainbow Basin	The badlands within the planning area expose one of the best known and most intensively studied late Miocene age fossil assemblages in the United States. Fourteen archaeological sites have been located, characterized by temporary habitation, flake scatter, petroglyphs, historic mining remnants (Bureau of Land Management 1991:32, 36). Scientific, traditional, public use.
Salt Creek Hills	Site of the first hard rock gold mine in the Mojave Desert (Bureau of Land Management 1992:5). Public use.

The area including the shore of Owens Lake, Haiwee Reservoir, Rose Valley, Cactus Flat, and McCloud Flat down to the Fossil Falls-Little Lake area is characterized by extremely high prehistoric site densities related to the presence of Owens Lake and Owens River and the nearby Coso and Sugarloaf obsidian quarries. Sites from this area have been important in defining cultural chronologies for the western Great Basin. Many more prehistoric sites may be expected in this area than have been formally recorded. The area also contains examples of Coso-style rock art, both painted and pecked. Recent archaeological and ethnohistorical research, moreover, suggests that the Numic religious and artistic tradition in the Coso region may represent 10,000 or more years of continuity (Whitley et al. 1999a, 1999b) – thus making this the longest-lived religious tradition so far identified in the world (National Register Nomination Form, Whitley2002). The Coso Mountains and adjacent areas were an important center of Shoshone habitation during the late prehistoric period.

The west edge of the planning area includes a series of canyons along the east flank of the Sierra Nevada. Nearly all of these canyons contain significant prehistoric sites and almost no formal inventory has been carried out in any of the canyons. They may be expected to contain sites that relate to middle to late-prehistoric settlement-subsistence patterns whereby resources at various elevations were exploited seasonally. The lower portions of the canyons that fall within the western Mojave Desert are known to contain what were probably winter habitation sites. Although a number of these sites are known, none have been subject to scientific study. These canyons extend into the Jawbone-Butterbredt ACEC south of Walker Pass.

The El Paso Mountains are known to contain extremely high site densities. Black Mountain in the El Pasos (and now in wilderness) was considered a sacred mountain by late prehistoric peoples. The entire mountain range is characterized by complexes of sites such as habitation sites, stone quarry sites, rock art sites (both painted and pecked), rock shelters, milling stations, rock alignments, and other site types. The total acreage that has been inventoried in the El Pasos is relatively small, so there are undoubtedly many unrecorded sites.

On the east side of the planning area there are complexes of prehistoric sites that appear to be related to the presence of Pleistocene Searles Lake, as well as sites relating to later periods. In the past year BLM archaeologists have inventoried approximately 1200 acres near Searles Lake and have found very high site densities as well as uncommon archaeological manifestations such as rock alignments, trails, and stacked stone features. Materials from some of these sites

have been dated by radiocarbon and other dating methods and the area appears to have been inhabited from the late Pleistocene-Early Holocene (c. 11,000 years ago) down to the historic period. The Lava Mountains should also be included in this high sensitivity area.

Historic mining occurred in a number of areas, including Darwin and adjacent areas, and Homewood Canyon. Extraction of borax and borates from Searles Lake that began in the late 1800s left historic remains on and adjacent to Searles Lake. Red Mountain, Randsburg, and Johannesburg all began as centers for historic mining operations in the area and remains of historic mining, milling, and prospecting are abundant.

The very low inventory levels, less than 1% in most areas, leaves the probability that there are many unrecorded prehistoric and historic resources and areas of high sensitivity that have not yet been identified.

3.7.1.7 Ethno-historic Overview

The ethnohistoric period begins with European contact in the 18th century, and is documented in diaries, official documents, narratives, and scholarly studies, the latter including interviews with native peoples. At the time of European contact, Paiute, Shoshone, Kawaiisu, Kitanemuk, Serrano, Vanyume, Chemehuevi, and Mojave occupied the planning area. Owens Valley Paiute occupied the far northern edge of the planning area, near Owens Lake, although this was peripheral to their primary areas around Owens Lake and River. The Western Shoshone lived south and east of Owens Lake, as far south as Little Lake. Kawaiisu occupied the southern Sierra, as well as Indian Wells Valley, El Paso Mountains, Tehachapi Mountains, and adjacent areas. Kitanemuk and Serrano occupied the southwestern portion of the planning area, as far south as the San Bernardino Mountains. The Vanyume lived along the Mojave River, north and east of Victorville. The Chemehuevi are the southernmost band of the Southern Paiute, and their extensive traditional territory included the eastern Mojave Desert. By the mid-19th century, they had settled along the Colorado River in traditional Mojave territory. The Mojave controlled the area north of Bill Williams River up to the Nevada border, but their main settlements were in the Mojave Valley.

The Owens Valley Paiute, Mojave, and Chemehuevi, after the latter's relocation to the Colorado River, farmed as well as harvested native wild plant foods. There is no record of farming among the other tribes. Ethnographic and ethnohistoric accounts indicate native populations had efficient processes to obtain food and raw materials, and had extensive knowledge of plants, animals, and the environment. Group settlement and subsistence patterns were within well-defined territories, but the length of time spent in any one camp varied among the tribes. Organization of society also varied among tribes, but can generally be described as loosely structured, allowing families to be self-determining while recognizing an importance of kinship lines. A sense of tribal identity, including language, customs, history, and religious beliefs, held members of each tribe together.

Under the National Historic Preservation Act, a federal agency consults with tribes so that they might identify traditional cultural properties of cultural and religious importance, and consider the effect of its actions on those places. Places meeting the criteria for traditional cultural properties are then evaluated under criteria for the National Register. Under the American Indian Religious Freedom Act and Executive Order 13007, a federal agency must consider the effects of its actions on Native American spiritual places and on access to such places by religious practitioners. Consultation usually combines compliance with both laws. A traditional cultural property is a place that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. Traditional cultural properties may overlap a number of categories of cultural resources such as archaeological sites, historic sites, areas where natural materials are collected, sacred sites, or sacred landscapes.

3.7.1.8 Significant Paleontological Localities

A triangular area roughly bounded by the Sierra Nevada Front, Highway 395, and Garlock Road has been subject to paleontological research for several decades and has been found to contain important paleontological resources. The Dove Spring Wash area contains a fossil assemblage known as the Dove Spring Lignites Local Fauna (Whistler 1990). Containing mollusks and a diversity of small vertebrates, "the Dove Spring Lignites Local Fauna is the most diverse, Late Pleistocene vertebrate assemblage recovered from fluviatile deposits in the Mojave Desert outside of the Mojave River basin" (Whistler 1990).

East of Dove Spring Wash, but within the same triangular area, the El Paso Mountains have been subject to paleontological study for over 50 years. The Raymond Alf Museum of Claremont, California is currently actively engaged in paleontological research of localities containing Paleocene (~60 million years old) mammals. The El Paso Mountains are the only locality on the west coast of the United States known to contain mammal fossils of this age; the closest known locations are in Wyoming. Consequently, these fossil localities are quite important (Lofgren n.d.).

A number of locations around Lake China that contain fossil remains of Rancholabrean megafauna have been recorded and studied. Although these sites are on China Lake Naval Air Weapons Station and not BLM, similar situations may apply around the edges of other Pleistocene dry lakebeds, such as Searles Lake within the planning area.

This area no doubt contains other important paleontological localities that have not been discovered or formally investigated.

Table 3-65 presents an overview of paleontological resources found within the planning area.

Table 3-65
Paleontological Resources Overview

MYA	CENOZOIC EPOCH	MAMMAL ASSEMBLAGES	
0			
		Rancholabrean	Rancho La Brea, Carpinteria Faunas (56).
1	PLEISTOCENE	Irvingtonian	Manix, Bautista Faunas (Savage & Downs 1954:56).
2			Coso Mt., San Timoteo Faunas
	PLIOCENE	Blancan	(Savage & Downs 1954:52).
5			
		Hemphillian	Mt. Eden, Kern R. Fauna (Savage & Downs 1954:52).
10		Clarendonian	Ricardo, Avawatz, Tejon Hills, Mint Canyon Faunas
			(Savage & Downs 1954:52).
15	MIOCENE	Barstovian	Barstow Fauna (Savage & Downs 1954:49).
			Tick Canyon Fauna (Savage & Downs 1954:49).
20		Hemingfordian	
25		Arikareean	Tecuya Fauna (Savage & Downs 1954:49).
30	OLIGOCENE	Whitneyan-Orellan	Kew Quarry Fauna (Savage & Downs 1954:47).
35		Chadronian	Titus Canyon Fauna (Savage & Downs 1954:47).
30		Duchesnean	Pearson Ranch Fauna (Savage & Downs 1954:47).
35	EOCENE	Uintan	Poway Fauna (Savage & Downs 1954:47).
50		Bridgerian	
		Wasatchian	
55		Clarkforkian	
		Tiffanian	
60	PALEOCENE	Torrejonian	
65		Dragonian-Puercan	
70			

(Woodburne 1978:26)

Tecopa Lake Beds consist of lacustrine siltstone and mudstone interbedded with layers of tufa and ash that range from 100 feet to 200 feet thick. Multiple vertebrate fossils have been recovered from exposures east of Tecopa Hot Springs, though numerous finds occur west and north. This area is one of only two placed that provide good examples of small Irvingtonian-age mammals. Additionally, it has yielded remains of a unique camel-like animal unknown elsewhere (Woodburne 1978:37).

The Avawatz Formation occurs in the rugged canyon land exposures on the south and southwestern flank of Avawatz Peak as well as along slivers of the Garlock and Death Valley Fault Zones. These deposits consist of coarse-grained conglomerate overlain by interbedded claystone, sandstone, and coarse- to fine-grained conglomerate. Coarse-grained breccia overlies the claystone section and is capped by arenaceous clastic sediments and some tuff with coarse-grained sandstone at the top. Faunal remains occur in the upper Clarendonian age unit (Woodburne 1978:49).

Pleistocene-age fossil bones have been reported in the lake sediments of Salt Spring Hills Playa, but not collected (Woodburne 1978:51).

Superior Dry Lake West consists of playa lakebeds near the southwest shore of Superior Dry Lake. Fossil bone and tooth fragments have been reported and are thought to be Rancholabrean (Woodburne 1978:53).

Jack Rabbit Spring is at the north end of Coyote Dry Lake. Playa lake deposits reportedly contain fossil camel bones dating to possibly the Rancholabrean (Woodburne 1978:54).

Cronese is comprised of sediments from the Barstow Formation. The relatively sparse fossil mammals are important because they probably represent the youngest Barstovian-age sample in the Mojave Desert. They show a relatively evolved Merychippus and are associated with tuffs dated at 12.3 million years (Woodburne 1978:56).

Alvord Mountain has a relatively thick sequence of tuffaceous sediment interbedded with tuffs and basalt flows, which is exposed in a valley drained by Spanish Canyon and its tributaries on the east flank of Alvord Mountain. The main fossil bearing unit is the Barstow Formation, followed by the Clews Fanglomerate and Spanish Canyon Formations of Hemingfordian age. Most of the fossils occur within a few feet in the middle of the Barstow unit. The stratigraphic succession of faunal remains corroborates the biostratigraphic and evolutionary sequence seen in the Barstow Formation in the Mud Hills (Woodburne 1978:57).

A series of sites occur in alluvial gravel, sandstone, and siltstone along bluffs overlooking the Mojave River. The bluffs occur from the Daggett-Yermo are east to Camp Cady. These deposits are Rancholabrean in age (Woodburne 1978:59).

Manix-Afton Canyon. The Manix Lake Beds consist of a succession of fine-grained lacustrine sediments interbedded with tufa and tuffs. They are unconformably overlain by alluvium and are cut by the Mojave River and its tributaries that flow into Afton Canyon. During the Pleistocene, Manix Lake extended westward into the Mojave Valley and north into present day Coyote Lake. This is one of the few well-studied Rancholabrean-age fossil assemblages, though much of the information is possibly unpublished as yet (60). The Manix beds near Barstow, CA have yielded an assortment of fossil mammal remains, most of which are limb bone fragments. This assemblage may be around 2 million years old, but evidence for exact dating is poor at present (Savage, Downs, and Poe 1954:53). Recovered specimens include true horses (*Equus*), jackrabbits (*Lepus*), camelids, true deer (*Odocoileus*), pronghorns (*Antilocapra*), and tapirs (*Tapirus*) (Savage, Downs, and Poe 1954:56).

The Cady Mountains comprise a relatively broad, sprawling range south of Afton Canyon. Like many Mojave ranges, a core of pre-Tertiary plutonic basement rock is overlain by a succession of mostly volcanic, then volcanic and sedimentary rocks that have been folded and faulted and are roughly Miocene age. These are overlain by less extensive coarse-grained approximately Pliocene deposits and Quaternary fan deposits, which are all finally cut by present streams whose valleys are filled with alluvium. Fossils in the Cady Mountains are derived from Miocene interbedded fluviatile clastic and tuffaceous sediments. The deposits are designated as the Hector Formation, which is composed of coarse- to fine-grained alluvial deposits interbedded with tuffs and a basalt flow. Total thickness is approximately 1,500 feet.

In the southern area, fossils of late Arikareean and early Hemingfordian fauna are separated by a tuff dated at 21 million years. This is one of the best calibrations of the boundary between currently known mammal ages. To the north near Afton Canyon, fossils are mainly of Hemingfordian age. This area is one of the most important regions in the Mojave Desert for biostratigraphy and geologic history. It provides one of the best single reference areas for the late Arikareean to late Hemingfordian interval in California and would form a secure base with which to evaluate the geological history of this part of the Mojave Desert (Woodburne 1978:62-63).

Southwest of Crucero, Rancholabrean age mammal remains were observed in conglomerates and sandstones (Woodburne 1978:65).

Daggett Ridge, about 4 miles southwest of Daggett, consists of a few hundred feet of fine-grained sandstone and siltstone and a thin, lower bed of gray sandstone that produces bone chips. This Miocene deposit contains small camels, a cervoid, and a horse. These remains date to about the middle of the Hemingfordian and could contribute significantly to an understanding of the little known faunas of this age in the Mojave (Woodburne 1978:66).

The Calico Mountain range east of Barstow contains the Jackhammer, Pickhandle, and Barstow Formations (Woodburn 1978:67). Fossil vertebrates have been found in the Calico Mountains in the Barstow Formation, which is approximately 3,000 feet thick. The primary specimen is of the grazing-browsing horse (*Merychippus intermontanus*). Insect-bearing nodules also occur. The Calico Range has definite potential to yield fossils, but much of it is located on private land with limited access (Woodburne 1978:67-68).

The Mud Hills, about 8 miles north of Barstow, contains outcrops of Jackhammer, Pickhandle, and Barstow Formations. The Barstow Formation, named for the Barstow fossil beds, is a non-marine, late Miocene age geologic unit derived from stream and lake deposited sediments in a basin subject to periodic volcanic ash fall and dust (Woodburne 1978:69; Savage, Downs, and Poe 1954:48). Deposition occurred about 15 million years ago. Many fossils occur in strata of mud mixed with volcanic ash. These strata often erode out as green and dark brown layers.

Fresh-water shells are abundant, but sabel palm is the only identified plant. Various institutions in the United States have collected a large number of mammal bones. Grazing-browsing horses (*Merychippus*) and camelids appear to be the most abundant. Many other mammal species have been described, including browsing horses (*Hypohippus*), dog-bears (*Hemicyon*), pronghorns, peccaries, chipmunks, field mice, rabbits, dogs, sabre cats, true cats, mastodons, large oreodonts (*Brachycrus*), and shrews. Two hawks, several ducks, a gull, a flamingo-like bird (*Megapaloelodus*), and a quail-like bird (*Cyrtonyx*) have been identified. The characteristics of the flora and fauna (called "Barstovian" fauna) suggest that grassland was available as well as vegetation similar to that of northern Mexico (Woodburn 1978:71; Savage, Downs, and Poe 1954:48). An overview of Barstovian Fauna is presented in Table 3-66.

Table 3-66
Barstovian Fauna

HERBIVORES		CARNIVORES	
Mastodonts	Gomphotherium	Dog-bears	HEMICYONIDS
Browsing horses (large)	HYPOHIPPUS	Dogs	Tomarctus
Grazing-browsing	Protohippus, Merychippus	Hyaenoid dogs	Aelurodon?
horses (intermediate)		Sabre-toothed cats	Machairodonts
Browsing horses (small)	Archeohippus	True cats	Pseudaelurus
Pronghorns	Merycodus		
Oreodonts	Brachycrus,	BIRDS & REPTILES	
Deer	Rakomeryx	Condor	
Camels	Hesperocamelus	Mourning Dove	
Peccaries	Dyseohyus	Ducks	
		Flamingo-like	Megapaloelodus
RODENTS		Gulls	
Rabbits	Hypolagus	Hawks	
Chipmunks	Tamias	Owls (Great Horned)	
Pocket mice	Perognathoides, Peridiomys	Quail-like	Cyrotonyx
Deer mice	Peromyscus		
Shrews	Limnoecus	Tortoise	

(Savage, Downs, and Poe 1954:49; Davenport and Goldbrandsen 1963:4; Woodburn 1978:69-71).

The Black Mountain-Gravel Hills region is a small-scale badlands north of Harper Lake. Most of the Tertiary section consists of the Barstow Formation, which is the most extensive unit in the Gravel Hills. Barstovian faunal remains of Merychippine horses and Merycodonts have been recovered from tuffaceous sandstone near Black Canyon (Woodburne 1978:74).

A number of sites occur in relatively coarse-grained fluvial sandstone and gravel beds near Victorville and extend north along the Mojave River to Barstow. These deposits relate to the uplift of the San Gabriel Mountains to the south and the history of the Mojave River. The best fossil specimens have been obtained from the gravel pits by Victorville, but others are known from exposures to the north. *Equus* is the most common species, among other Rancholabrean fauna (Woodburne 1978:84).

The Cushenbury beds are often referred to as the Old Woman Sandstone of Shreve and comprise a succession 200 feet to 1,000 feet of massive reddish-buff and red-brown conglomeratic arkose with a matrix of uncemented, poorly sorted, coarse-grained, angular fragments of quartz, feldspar, and hornblende that support subangular to subrounded pebbles of andesite, gneiss, quartzite, and other minor types. These lithologies are the oldest Tertiary deposit to be derived from the San Bernardino Mountains, on the north side, and reflect uplift of the ranges. A small, but important, and growing collection of small mammal fossils has been collected from the Cushenbury beds. They appear to be Blancan or late Blancan age and suggest that the San Bernardino Mountains began shedding debris to the north about 2 million years ago. These fossils provide the only evidence for the age of that uplift (Woodburne 1978:85).

At Twenty-Nine Palms, there is an unnamed succession of mainly northeast-dippling fluvial and lacustrine sediments interbedded with tuff a few miles east of the main north road from Twenty-Nine Palms. The exposures are relatively isolated patches of older sediments surrounded by younger alluvium. A small collection of Rancholabrean fauna, mostly large mammals, has been collected. These include *Equus*, *Odocoileus*, *Tanupolama*?, *Hemiauchenia*?, *Bison*, *Ovis*, *Breameryx*? *geopherus*, *Nothrotheriops*? *taxidea*, *Camelops* (Woodburne 1978:87).

3.7.2 Tribal Governments and Policies

Eight tribal governments who might attach religious and cultural significance to historic properties within the planning area were contacted in June 2000 and from May to July 2001. These included the Lone Pine Paiute Shoshone, Timbisha Shoshone, San Manuel Band, Morongo Band, 29 Palms Band, Fort Mojave Tribe, Chemehuevi Tribe, and Colorado River Indian Tribes. Contact was made via letter and phone. When contacted by phone in July 2001, the Lone Pine Paiute Shoshone, Timbisha Shoshone, Fort Mojave Tribe, Chemehuevi Tribe, and Colorado River Indian Tribes requested additional information, and information packets were sent to those tribes. In August 2001 a briefing was presented to the Native American Lands Conservancy at their request. As a consequence of contact, no tribe or band identified religious or cultural significance to historic properties within the planning area.

3.7.3 BLM Consultation Procedures

CDCA Plan Policies: The CDCA Plan recognizes the importance to the public, scientists, Native Americans, and others of prehistoric, historic, and paleontological resources. Plan goals are to conduct inventory to the fullest extent possible to expand knowledge of these resources, protect and preserve to the greatest extent possible representative samples of resources, give full consideration to these resources during land-use planning and management decisions, manage to maintain and enhance resource values, ensure BLM's activities avoid inadvertent damage to these resources, and achieve proper data recovery where adverse impacts cannot be avoided. Specific guidance regarding vehicle route approval is to use resource data during the route approval process to help minimize or eliminate adverse impacts on these resources from access and vehicle use.

The CDCA Plan also states that cultural and religious values held by Native Americans will be considered in all CDCA land use and management decisions. CDCA Plan goals are to identify Native American values through regular contact and consultation; give full consideration to Native American values in land use planning and management decisions consistent with statue, regulation, and policy; and manage and protect Native American values wherever prudent and feasible.

Compliance With Pertinent Statutes and Regulations: The BLM has responsibilities and authorities to consider, plan for, protect, and enhance historic properties and other cultural resources under the National Environmental Policy Act, Archaeological Resources Protection Act, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, National Historic Preservation Act, and other authorities.

Section 106 of the National Historic Preservation Act requires Federal agencies to consider the affect of undertakings on historic and prehistoric resources and give the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. Section 101 (d)(6))B) of the Act requires Federal agencies to consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by an undertaking. When Indian tribes and Native Hawaiian organizations attach religious and cultural significance to historic properties off tribal lands, the Act requires Federal agencies to consult with such tribes and organizations in the Section 106 process. In following the Section 106 process, a Federal agency documents the area of potential effects, compiles and analyzes cultural resource data and literature, seeks information from consulting parties, synthesizes information, identifies historic properties, assesses adverse effects, and seek ways to resolve adverse effects. BLM meets its responsibilities under the National Historic Preservation Act through a Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers and through State Protocols.

CHAPTER FOUR
ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 describes the environmental impacts of each of seven alternatives described in Chapter 2. The discussion begins by listing assumptions that authors were instructed to utilize as they prepared their impact analyses. Following this, measurable "thresholds of significance" are presented. An environmental effect is deemed to be "significant" if it exceeds a threshold of significance. The discussion then addresses each of the seven alternatives in turn:

- Alternative A: Proposed Action – Habitat Conservation Plan
- Alternative B: BLM Only
- Alternative C: Tortoise Recovery Plan
- Alternative D: Enhanced Ecosystem Protection
- Alternative E: One DWMA – Enhanced Recreation Opportunities
- Alternative F: No DWMA – Aggressive Disease and Raven Management
- Alternative G: No Action

Each of these discussions includes an analysis of the cumulative effect of implementing each alternative, taking into consideration other current or reasonably expected projects, programs and activities likely to occur in or near the planning area during the 30-year term of the plan. Cumulative impacts are addressed throughout the analyses presented in this chapter. An overview of cumulative impacts is also presented at the conclusion of the analysis of each alternative.

Analysis Assumptions. The analysis of impacts was guided by the assumptions set forth in Table 4-1.

Table 4-1
Assumptions

CATEGORY	ASSUMPTIONS
Impact Analysis	• The discussion of impacts is based on the best reasonably available data. Knowledge of the planning area and professional judgment, based on observation and analysis of conditions and responses in similar areas, were used to infer environmental impacts where data is limited. • Acreage figures and other numbers used in this analysis are approximate projections for comparison and analytic purposes only. Readers should not infer that they reflect exact measurements or precise calculations. • Short-term impacts would occur over a 5-year period following implementation, while long-term impacts would occur over a 5- to 30-year period.

CATEGORY	ASSUMPTIONS
Plan Implementation	• Implemented actions would comply all valid existing rights, regulations, and agency and jurisdictional policies. • Implementation of the Plan would begin shortly after adoption of the Plan by the participating agencies and jurisdictions, and all implemented actions would subsequently conform to the specific approved Plan decisions. Implementation of all actions on BLM-administered public lands would begin within thirty (30) days of signature of the BLM Record of Decision by the BLM California State Director. • Adequate funding would be available to implement the Plan. • Additional law enforcement and maintenance personnel would be made available as called for by each alternative.
Long-term Regional Trends	• High rates of urban growth would continue, especially in the southern and southwestern portions of the planning area • Fort Irwin would utilize lands transferred by Congress from BLM to Army for military training activities following full compliance with FESA • The level of recreation use would continue to increase in proportion to regional population growth • BLM and Edwards Air Force Base would continue to block up lands in conformance with the land tenure adjustment strategy

Thresholds of Significance: An impact is deemed to be significant if it exceeds one or more of the significance thresholds presented in Table 4-2.

Table 4-2
Significance Thresholds

RESOURCE	SIGNIFICANCE THRESHOLDS
Air Quality	• Causes or contributes to any new violation of the National Ambient Air Quality Standards (NAAQS)(federal conformity). • Increases the frequency or severity of any existing violation of any NAAQS (federal conformity). • Delays timely attainment of any standard or any required interim emission reduction or other milestones (federal conformity). • Results in non-conformance of a federal action with applicable implementation plan (federal conformity). • Violates the fugitive dust rule • Exceeds significance thresholds established by air districts for a number of pollutants. The following thresholds are from MDAQMD and are in tons per year: • Carbon Monoxide (CO)---------100 • Oxides of Nitrogen (NO_x)--------25 • Volatile Organic Compounds----25 • Oxides of Sulfur (SO_x) ----------25 • Particulate Matter (PM_{10}) --------15
Natural Communities	• Causes any loss of wetland communities (riparian woodland, alkali springs, seeps and meadows, freshwater spring, montane meadow, desert fan palm oasis). • Results in permanent loss of more than 25% of mesquite bosque or 10% of native grassland. • Degrades or eliminates more than 10% of desert dunes with occupied habitat for target species.

RESOURCE	SIGNIFICANCE THRESHOLDS
Unlisted Wildlife and Plant Species	• Reduces the numbers or restricts the range of a species within the state by greater than 25%. • Allows for extensive, new fragmentation of a conservation area for an endemic or disjunct plant or animal species (Barstow woolly sunflower, desert cympoterus, Mojave monkeyflower, Parish's phacelia, Shockley's rock-cress, Bendire's thrasher).
Listed Wildlife and Plant Species	• CEQA: *Any* take or adverse effect to a State-listed species that is not minimized or fully mitigated. • The size of an incidental take area exceeds the size of the conservation area. • Reduces designated critical habitat within a conservation area by more than 5 percent. • Loss of any occupied habitat for Lane Mountain milkvetch or triple-ribbed milkvetch.
Desert Tortoise	• CEQA: *Any* take or adverse effect to a State-listed species that is not minimized or fully mitigated. • Any alternative that authorizes more than 1% ground disturbance within the conservation area. • Any new development or incompatible land use affecting more than 5% of the higher density tortoise areas. • Any reduction of more than 5% of designated critical habitat within the tortoise conservation area. • The size of the incidental take area exceeds the size of the conservation area. • Any allowance of sheep grazing in critical habitat. • Any expansion or creation of new OHV open areas or recreation areas in critical habitat. • Any new management action that provides for less protection than is currently provided for in Category I and II habitats, including substantial reclassification of Category I and II to Category III Habitat. • CDCA multiple use guidelines for class M, unclassified public lands, or class I within a DWMA., not overridden by other (e.g. ACEC) restrictions
Mohave Ground Squirrel	• CEQA: *Any* take or adverse effect to a State-listed species that is not minimized or fully mitigated. • Any extensive, new fragmentation of the MGS Conservation Area. • Any large scale development (greater than 2 mi^2 in size) in potential source areas on Coolgardie Mesa, Pilot Knob, or Little Dixie Wash.
Livestock Grazing	• Grazing made unavailable on public land as allotments are voluntarily relinquished. • Grazing made unavailable on five or more ephemeral allotments in DWMAs. • The loss of opportunity to utilize forage production above permitted use when climatic conditions result in excess forage being available in DWMAs. • Exclusion of cattle operations from more than 90,000 acres of perennial rangelands until June 15th when ephemeral forage production does not reach the 230 Ibs./acre threshold in DWMAs. • Elimination of ephemeral sheep grazing from Middle Stoddard Allotment • Elimination of 80,000 acres of ephemeral sheep allotments grazing • Preclusion of ability to utilize perennial forage where operations have demonstrated good stewardship and allotment is in good to excellent condition and are achieving all public land health standards.

RESOURCE	SIGNIFICANCE THRESHOLDS
Mineral Development	Unavailability to exploration and development of any deposits in the following categories: • Areas of high mineral potential (or moderate potential for regionally or nationally significant commodities), including sand and gravel materials designated by the State of California as "regionally significant" pursuant to SMARA; • Critical or strategic metals or minerals, or minerals on the National Defense Stockpile list, especially those having an import reliance of 50 percent or more, or importance to the local economy; Preclusion of known mineral deposits, especially: • Major supplier of a commodity to a region covering several counties or states, i.e., crushed stone for landscaping; • Aggregate source needed for maintenance or expansion of a state or federal highway; • Aggregate or industrial mineral resource needed to maintain or replace public works or public and private properties impacted as a result of a state, local, or national emergency situation. Premature closure of a mineral operation, or its substantial reduction and loss of resources, due to increased costs associated with restrictions or fees.
Recreation	• Loss of access to any area of historic recreational importance • Substantial overcrowding caused by "spill over" effects resulting from closure of other areas to recreation access.
Motorized Vehicle Access	• Loss of access to private land parcels or mining claims • Loss of access to historically important recreation access points or staging areas
Cultural Resources	Potential for substantial degradation of important resources, including the elimination of important examples of the major periods of California history or prehistory[1].

4.2 ALTERNATIVE A: PROPOSED ACTION

4.2.1 Air Quality, Soils and Water

4.2.1.1 Air Quality

Introduction: Impacts would be in the form of gaseous and particulate mater that is emitted into the air as a result of the activities being analyzed. All of the pollutants subject to analysis are addressed in federal, state and local laws, statutes, regulations and rules. The federal and state ambient air quality standards define the criteria pollutants that are part of the emissions that are typically analyzed. In addition to the criteria pollutants, there are criteria for air toxics, hazardous air pollutants (HAPs), Prevention of Significant Deterioration (PSD), fugitive dust and regional haze.

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1 Resources that are listed in the California Register of Historical Resources or have been determined to be eligible for such listing, resources included in local registers of historic resources as defined in the California Public Resources Code, or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant" are considered significant resources for CEQA purposes. The fact that a resource is not already listed in a register or determined eligible for listing does not preclude a lead agency from determining that "the resource may be an historical resource as defined in the Public Resources Code…". A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

The analysis is based upon various activities' potential to emit. In the case of the West Mojave Plan, there are only a few pollutants that have the potential to be emitted. The analysis is further limited by the need to look at changes in emissions that would occur as a result of various alternative actions. Most activities that produce emissions would not be impacted by the Plan alternatives and will not be addressed in this analysis. The activities associated with the Plan that would have an impact on air quality include OHV activities, vehicle routes and designations, restoration and livestock grazing. Changes in these activities would result in changes in disturbance rates to soil surfaces and would result in changes in PM_{10} and $PM_{2.5}$ emissions. Activities associated with growth and development may emit particulates such as PM_{10} and $PM_{2.5}$ and ozone precursors including nitrous oxides and reactive organic gases. Based upon the potential to emit and emissions that are likely to be affected by the Plan, the analysis would primarily address the particulate emissions PM_{10} and secondarily the ozone precursor emissions. In addition, these two pollutants are important because large portions of the planning area are classified as federal nonattainment areas for PM_{10} and/or ozone.

Planning Assumptions for Air Quality: State Implementation Plans (SIPs) are prepared for the federal nonattainment areas. These SIPs are designed to result in compliance with the NAAQS by federal deadlines. The SIPs are implemented through a series of rules. In addition, air quality is highly regulated by a number of additional federal, state and regional regulations and rules. These regulations and rules apply to many of the activities that appear in the Plan alternatives. It is assumed that the activities would be conducted in compliance with the regulations and rules.

Expected Impact of Alternative A on Air Quality: This alternative would result in reductions in emissions of particulate matter from BLM managed lands, and corresponding declines in PM_{10} concentrations in a number of areas. This would be due to restrictions, reductions or elimination of activities and disturbed areas that have the potential to emit pollutants. Some activities would have the potential to increase emissions. These activities along with their pollutants, relative changes in emissions, time scales and locations are expected to be as described by Table 4-3.

Table 4-3
Air Quality Impacts – Alternative A

ACTIVITY	POLLU-TANT	CHANGE	MAGNI-TUDE	TIME SCALE	LOCATION	NOTES
Private land development	PM_{10}	Increase	Slight	Short term	Antelope & Victor Valleys	Due to possible short term increase in development. Long term development likely limited by other factors.
	Ozone precursors	Increase	Slight	Short term	Antelope & Victor Valleys	Due to possible short term increase in development. Long term development likely limited by other factors.

ACTIVITY	POLLU-TANT	CHANGE	MAGNI-TUDE	TIME SCALE	LOCATION	NOTES
Paved roads	PM_{10}	Increase	Slight	Short & long term	Within DWMAs	Could eliminate paving as dust control measure on unsurfaced roads
Allowable ground disturbance	PM_{10}	Increase	Up to 1% from source[1]	Long term	Within West Mojave area	Increased ground disturbance and bare ground would emit additional PM_{10}
Restoration of existing disturbances	PM_{10}	Increase	Slight	Short term	West Mojave wide	Ground disturbance and bare ground would initially emit PM_{10}. Sites would stabilize within 1-2 years.
	PM_{10}	Decrease	Slight	Long term		
Livestock grazing	PM_{10}	Decrease	Slight[2] Approximately 55% reduction from this source	Long term	Mostly within Mojave Desert Nonattainment Area	Elimination of all or portions of 12 grazing allotments
OHV route designation	PM_{10}	Decrease	Moderate[3]	Short & long term	Most would be within Mojave Desert Nonattainment Area	Wind erosion would cease as route stabilizes in 1-2 years
OHV competitive events	PM10	Decrease	Small	Short and long term	Within DWMAs & MGS conservation areas. Most would be within Mojave Desert Nonattainment Area	Due to elimination of speed events and seasonal restrictions on all events in DWMAs & MGS conservation areas
Fort Irwin Expansion	PM_{10} Ozone	None expected			Lands outside base.	Due to exclusion of public access to base, base is not subject to NAAQS. Compliance is by maintaining standards at the base boundary. All changes in activities on the base would be subject to federal conformity analysis.

Notes:
1. MDAQMD inventory of sources showed nearly 8% of PM_{10} emissions from construction and bare ground in 1990.
2. Livestock grazing accounted for .4% of MDAQMD PM_{10} inventory (1990).
3. Wind erosion from unpaved roads accounted for 20% of PM10 emissions in MDAQMD inventory (1990).

Significance: There would be a significant reduction in PM_{10} emissions as a result of Alternative A. These reductions could exceed 1000 tons of PM_{10} per year.

Federal Conformity: A federal conformity analysis is required for any federal action within any federal nonattainment or maintenance area. There are seven areas within the western Mojave Desert that meet these criteria. These are the Owens Valley, Coso Junction, Indian Wells Valley, Trona and Mojave Desert PM_{10} planning areas and the Eastern Kern County and Mojave Desert modified ozone-planning areas. The clean air act and its implementing rules (40 CFR part 93) state that federal agencies must make a determination that proposed actions in federal nonattainment/ maintenance areas conform to the applicable implementation plan before the action is taken. In addition, the action cannot cause or contribute to any new violation of the NAAQS, cannot increase the frequency or severity of any existing violation of any NAAQS or delay timely attainment of any standard or any required interim emission reduction or other milestones.

The BLM has developed a ten-step process to comply with the federal conformity requirements. These ten steps are: (1) Determine spatial and jurisdiction applicability, (2) Describe SIP status and content, (3) Develop any necessary background information, (4) Develop air quality impact analysis, (5) Compare activity to applicable SIP provisions and rules, (6) Develop conclusion statement, (7) Prepare a formal determination, (8) Conduct an agency/public review, (9) Submit the determination to appropriate regulatory agencies and (10) Archive the results. Steps 7-10 must be completed only if the project has total emissions of criteria pollutants exceeding deminimus levels established in the regulations (40 CFR 93.153 (b)(1&2)). Most of these steps are carried out in this EIR/S.

Motorized Vehicle Access Network: The motorized vehicle access network has not been fully implemented and motorized vehicles continue to use routes that have yet to be signed or mapped closed, or rehabilitated. Implementation of Alternative A, including signing, maintenance of open routes, disguise of prominent closed routes and route rehabilitation will result in a net reduction in the mileage of unpaved routes that are utilized by motorized vehicles compared to the present situation. It is not expected that the number of vehicle miles traveled will change as a result of the West Mojave Plan. Moreover, the West Mojave Plan substantially decreases the acreage of lands within tortoise DWMAs and adjacent to open routes that would be available for stopping and parking, reducing a 600-foot wide stopping and parking belt to 100 feet. Camping in tortoise DWMAs would also be limited to previously disturbed areas adjacent to open routes, rather than anywhere within 300 feet of the centerline of the route. These measures will substantially reduce new ground disturbance. Finally, the West Mojave Plan commits BLM to an aggressive program of closed route rehabilitation. The conclusion follows that emissions from this source will decrease.

Conformity Analysis and Conclusion: Alternative A results in significant reductions of PM_{10} emissions. All of the SIP requirements for the five federal PM_{10} nonattainment/maintenance areas are met by the alternative for PM_{10}. Ozone precursor emissions could increase slightly in the short term under this alternative. These emissions are

based upon projected population growth in the region. The projected population growth as a result of this plan is lower than the projections used in the regional transportation plans and conformity statements. Because the precursor emission levels are lower than the budget established the in the regional plans, Alternative A conforms to the SIP. All emission levels are below deminimus levels, so no further conformity analysis is necessary and a formal conformity determination is not required.

4.2.1.2 Soils

Off Highway Vehicle Impacts: OHVs impact soils properties in several ways. OHVs increase soil compaction, which in turn effects infiltration and water erosion, soil moisture, wind erosion, and soil chemistry.

Most desert soils, including many sands, are susceptible to intense compaction if driven across a sufficient number of times. Places heavily used by OHVs such as pit areas, trails, and hillclimbs generally are intensely compacted. Compaction produced in most soils depends on vehicle characteristics, amount of activity, and soil water at the time of impact that on differences between soil properties. For example, increased OHV activity on wet soils would increase compaction. Some cohesion-less sands such as sand dunes, however, are very resistant to compaction whether wet or dry. Many playa soils would have considerable resistance to compaction if driven on when dry. (BLM, 1980)

Intense OHV use in steep areas (primarily hillclimbs on slopes over 20 percent) yields large increases in water erosion as well as mechanical displacement of soil. Where highly compacted trails run for long distances down gentle slopes, significant erosion may occur on relatively level terrain with slopes as low as three percent (BLM, 1980).

Most desert soils are much more susceptible to wind erosion after disturbance than in an undisturbed condition (BLM, 1980). Wind erosion occurs whenever bare, loose, dry soil is exposed to wind of sufficient speed to cause soil movement. This process would be accelerated whenever the natural equilibrium of the soil is disturbed. During a dust storm, the bulk of eroding material from soils moves only a foot or two above the soil surface where it is subject to downwind transport. Two basic processes are involved in wind erosion: detachment and transport. Detachment is the initiation of soil movement and occurs when wind force or the impact of moving particles is strong enough to dislodge stationary soil particles. After detachment, soil particles are subject to transport by wind through the air or along the soil surface until eventually deposited when wind velocity decreases (NRCS, 29 Palms)

Erodibility varies considerable within and among soils as a result of variations in texture, organic matter content and aggregate structure. In general, erodibility increases with increasing sand content and decreases with clay content. (NRCS, 29 Palms) In addition, biological crusts, microorganisms (lichens, algae, cyanobacteria, microfungi) and non-vascular plants (mosses, lichens) that grow on or just below the soil surface. Soil physical and chemical characteristics, along with seasonal precipitation patterns, largely determined the dominant organisms

comprising the crust. These crusts are primarily important as cover and in stabilization soil surfaces. In rangelands, biological soil crusts function as living mulch my retaining soil moisture and discouraging annual weed growth. They also reduce wind and water erosion, fix atmospheric nitrogen, and contribute to soil organic matter (Eldridge and Greene, 1994 in USDI, 2001).

4.2.1.3 Water Quality

Overview: The Regional Water Quality Boards will regulate wastewater disposal associated with urban water use as a point source. The local jurisdictions and the Regional Water Quality Boards will regulate storm water and other urban nonpoint sources.

The primary surface water quality parameter of concern in the plan area is sediment. There is naturally high levels of sediment in the ephemeral surface water that flows in response to storm events because of ongoing geologic processes.

When the soil is disturbed by anthropogenic activities it is more susceptible to erosion. Erosion increases the sediment available in channels for transport by surface water when it occurs.

Particle size, slope, vegetative cover and distance from the waterway determine the length of time the eroded particles take to enter the waterway for transport either in the water column (suspended sediment) or along the streambed (bedload). Small particles will be transported more easily, steeper slopes and reduced vegetative cover increase the velocity of the water increasing the waters capacity to transport more and larger particles, particles in or close to a waterway will be transported first. The alluvial fans complicate these general rules because of the tendency for channels to migrate across the fan.

The suspended sediment water quality objective of the Lahontan Regional Water Quality Board is "the suspended sediment load and suspended sediment discharge rate to surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses."

Eroded sediment and other earthen materials that reach surface waters as a result of human activities are considered waste discharges under the Porter-Cologne Water Quality Control Act.

In the Mojave Desert it is difficult to quantify an increase in human caused sediment that reaches surface waters because sediment transport is part of the natural processes. Storm events that produce sufficient water to transport the sediment are infrequent and episodic so sampling the water cannot be scheduled and is inherently difficult. Equipment can be designed to take samples, but is subject to vandalism and being washed out if the flow is large.

It is easier to measure either the sediment or observe the effects of the sediment. Sediment can reduce the hydraulic capacity of stream channels, causing an increase in flood crests and flood damage. It can fill drainage channels, especially along roads, plug culverts and storm drainage systems, and increase the frequency and cost of maintenance.

Even when measuring the sediment by using sediment basins it is a challenging exercise to determine how much is anthropogenic.

A semi-quantitative determination of human caused sediment can be made by using a model to compare alternatives with each other or with existing conditions by determining directly related factors such as vegetative cover, amount of disturbed soil and soil characteristics directly related to erosion potential. Then use one of the standard soil erosion models. Because we have limited soils information in the study area this is not possible at the present time.

For this analysis water quality (suspended sediment) impacts are assumed to be proportionate to the soil erosion impacts although they may disjunct in time and place.

Water Quality and Groundwater: The West Mojave Plan may induce human population growth slightly - a maximum expected increase of 0.62% per year. This predicted increase assumes that in the areas that adopt the Plan, the necessary permits will be less costly and take less time to process. Growth is expected to focus in the vicinity of current urban areas, including incorporated cities, rather than in remote desert areas. (Plan Vol.1 at Section 5.3).

Community development in current urban areas would not be exempt from local and regional planning, from CEQA requirements or from Regional Water Quality Board requirements.

Population modeling predicts no impacts on groundwater levels in the areas currently contracted to receive surface water from the California State Project. The imported water could supply some unspecified local groundwater recharge.

Areas where urbanization replaces agricultural use of groundwater should cause fewer declines in groundwater levels than under agriculture. Especially with conservation incentives for outside water use, household water use will use less water per acre than agriculture.

In other urbanizing areas using groundwater, the Mojave River Adjudication, county ordinances, and local groundwater districts generally limit groundwater use.

The Plan proposal in Vol. 1 at 2-72 ties the depths to groundwater monitored under the Mojave River Adjudication to the availability of the incidental take permit and adds an additional layer of protection for the discussed species.

Livestock Grazing: Grazing can contribute to nonpoint water degradation. The primary parameters of concern are listed in the Standards (chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen) (see above, Section 2.2.5.1).

Of these parameters, grazing livestock are highly unlikely to influence the basic chemical composition of water. Cattle and other animals including birds can have a direct effect on nutrients and fecal bacteria by defecating near or in surface water. The impact lessens with time and distance from the water. If the nutrient levels from feces or from natural sources such as phosphorus in local soils are high enough, the water can support algal growth that can result in diurnal fluctuations in the amount of dissolved oxygen. Activities that disturb bank integrity, including tramping by cattle, can directly increase suspended sediment and turbidity. If a bank failure widens a channel and makes the channel shallower, water temperature will respond more directly to air temperature resulting in a daytime summer increase above that in an undisturbed channel. Browsers, including cattle and deer, utilize woody plants in riparian areas. and if this results in a marked decrease in shading of the water,there can be an increase in stream temperature depending on other shading factors such location in a canyon.

Healthy riparian areas with well-developed woody species provide physical obstacles to cattle. Well-vegetated riparian areas provide buffer that filters out sediment, utilizes nutrients and shades the stream protecting the stream water quality.

The Regional Public Land Health Standards and Guidelines for Grazing Management (Standards and Guides) includes objectives to protect water quality and to maintain riparian/wetland and stream function (see Section 2.2.5.1, Objectives A and B). The proposed alternative will adopt and implement the standards and guides. Implementation of the Standards and Guides will result in health assessments of upland and riparian/wetland areas with the commensurate commitments to restore the health when grazing causes degradation.

The BLM has completed Rangeland Health assessments on the Cady Mountain, Cronese Lake, Harper Lake, Ord Mountain, and Rattlesnake Canyon allotments (Appendix O). These allotments also have Allotment Management Plans that are accepted as Best Management Practices for grazing in the Regional Water Quality Board's Basin Plans.

In the other allotments, grazing permit renewals will have terms and conditions to assure rangeland health, which includes water quality, and riparian/wetland health. These terms and conditions as they are implemented will reduce water quality impacts from grazing animals.

4.2.2 Biological Resources

4.2.2.1 Natural Communities

The proposed action affects the desert's natural communities in different ways. Conservation and incidental take of the two flagship species, desert tortoise and Mohave ground squirrel, would result in the largest acreage impact to the two dominant communities of the flatlands, creosote bush scrub and saltbush scrub. Conservation and incidental take of the unlisted species, many of which are peripheral to the planning area, would impact smaller areas of a variety of natural communities at the desert edge. The West Mojave endemic species, particularly plants, are often found only in unique and rare natural communities, and their conservation results in nearly complete protection of these areas. Table 4-4 lists these communities and the acreage of each.

The three natural communities comprising 88% of the West Mojave (creosote bush scrub, saltbush scrub and Mojave mixed woody scrub) would receive major benefits with Alternative A and achieve conservation more in proportion to their distribution. Chaparral at the desert edge would continue to be under-represented by conservation, though large unfragmented areas are protected within the National Forests.

Impacts of recreation and route designation to natural communities are primarily cumulative in nature. Most of the recreation areas (open areas) for off road vehicles are within the creosote bush scrub, desert wash and saltbush scrub communities, though riding on playas is also popular and may impact the adjacent alkali sink scrub vegetation. In mountainous areas, most travel is confined to roads, so that the woodland communities (Joshua tree woodland, scrub oak, pinyon pine woodland, juniper woodland) are not subject to direct vehicle impacts. In mountainous areas with a large number of routes, habitat fragmentation is an issue, depending to some extent on the frequency of use.

In all areas of public lands containing the rarer and more valuable (to wildlife) riparian communities, BLM has already designated routes, primarily through the ACEC Plan process. These roads, as in the canyons of the east Sierras, Jawbone-Butterbredt ACEC, Big Morongo Canyon ACEC, Whitewater Canyon ACEC and Afton Canyon are designated to avoid major impacts to riparian dependent wildlife, such as migratory birds. Isolated springs and seeps, however, are accessible and not entirely free of route proliferation, cleared camping areas and excessive disturbance. In some cases, such as the springs in the Argus Mountains and Great Falls Basin ACEC, BLM has initiated improvements such as barriers and designated parking areas that protect the wetland communities from vehicle damage.

Additional work to define site-specific solutions for access to springs may be needed to protect important sites. The El Paso Mountains and Ridgecrest subareas will provide this analysis through the El Paso Collaborative Access Planning Area process. In other areas, such as the Juniper subregion, monitoring of the vehicle disturbance at springs (if any) is the best way to determine if adverse impacts from the route designation are taking place. Route designation in

the Juniper subregion has closed most single-track routes with direct access to Arrastre Canyon.

Kane Springs in the Ord-Rodman subregion is an important spring that clearly benefits from the designation of Alternative A, compared with the No Action Alternative (Alternative G). The same is true for Kane Wash, which contains a desert willow community, because the designated routes utilize the parallel utility easement route out of the streambed.

In the Bighorn subregion, minor modifications of the June 30, 2003 network will result in a slightly more cohesive network where routes cross jurisdictional boundaries separating BLM and Forest Service lands. Routes near Vaughn Spring, Mound Spring and Viscera Spring (on adjacent Forest Service lands) will need continued monitoring to determine if the relatively dense network in this location is detrimental to the riparian communities at these springs.

Table 4-4

West Mojave Natural Communities Impacted by Alternative A (In Acres and %)

NATURAL COMMUNITY	TOTAL ACREAGE	EXISTING CONSERVATION	NEW CONSERVATION	TOTAL CONSERVATION	POTENTIAL LOSS
Alkali seep	59	0	0	0	59 (100)
Alkali sink scrub	10,895	1,014 (9.3)	4,138 (38.0)	5,152 (47.3)	5,743 (52.7)
Big sagebrush scrub	9,601	8,108 (84.5)	1,081 (11.3)	9,190 (95.7)	411 (4.3)
Blackbush scrub	132,603	87,343 (65.9)	7,545 (5.7)	94,888 (71.6)	37,715 (28.4)
Chamise chaparral	28,593	0	0	0	28,593 (100)
Cottonwood-willow riparian forest	11,533	6,793 (58.9)	1,571 (13.6)	8,364 (72.5)	3,170 (27.5)
Creosote bush scrub	4,025,617	459,004 (11.4)	1,320,049 (32.8)	1,779,053 (44.2)	2,246,563 (55.8)
Desert holly scrub	21,716	2,190 (10.1)	17,452 (80.4)	19,641 (90.4)	2,075 (9.6)
Desert wash scrub	34,496	4,902 (14.2)	3,518 (10.2)	8,421 (24.4)	26,075 (75.6)
Fan palm oasis	33	0	0	0	33 (100)
Freshwater seep	388	0	0	0	388 (100)
Gray pine-oak woodland	2,678	49 (1.8)	0	49 (1.8)	2,629 (98.2)
Greasewood scrub	3,662	0	1,947 (53.2)	1,947 (53.2)	1,715 (46.8)
Hopsage scrub	6	5 (83.3)	1 (16.7)	6 (100)	0
Interior live oak woodland	589	0	0	0	589 (100)
Jeffrey pine forest	1,811	1,811 (100)	0	1,811 (100)	0
Joshua tree woodland	10,383	4,763 (45.9)	269 (2.6)	5,032 (48.5)	5,351 (51.5)
Juniper woodland	87,167	6,960 (8.0)	1,434 (1.6)	8,395 (9.6)	78,772 (90.4)
Mesquite bosque	7,110	2,491 (35.0)	1,349 (19.0)	3,839 (54.0)	3,271 (46.0)
Mojave mixed woody scrub	689,589	378,795 (54.9)	124,710 (18.1)	503,505 (73.0)	186,084 (27.0)
Mojave riparian forest	4,687	28 (0.6)	0	28 (0.6)	4,659 (99.4)
Montane meadow	966	0	0	0	966 (100)
Montane riparian scrub	2,228	203 (9.1)	238 (10.7)	441 (19.8)	1,787 (80.2)
Native grassland	3,375	0	68 (2.0)	68 (2.0)	3,306 (98.0)
Northern mixed chaparral	992	992 (100)	0	992 (100)	0
Pinyon pine woodland	18,773	12,077 (64.3)	1,171 (6.2)	13,248 (70.6)	5,525 (29.4)

NATURAL COMMUNITY	TOTAL ACREAGE	EXISTING CONSERVATION	NEW CONSERVATION	TOTAL CONSERVATION	POTENTIAL LOSS
Pinyon-juniper woodland	158,329	84,581 (53.4)	12,022 (7.6)	96,603 (61.0)	61,727 39.0)
Rabbitbrush scrub	7,842	92 (1.2)	0	92 (1.2)	7,750 (98.8)
Scrub oak chaparral	36,385	23,106 (63.5)	0	23,106 (63.5)	13,279 (36.5)
Saltbush scrub	591,713	18,897 (3.2)	218,608 (36.9)	237,505 (40.1)	354,409 (59.9)
Semi-desert chaparral	128,230	3,855 (3.0)	5,156 (4.0)	9,010 (7.0)	119,220 (93.0)
Shadscale scrub	38,602	7,194 (18.6)	31,408 (81.4)	38,602 (100)	0
TOTAL	6,070,651	1,115,253 (18.4)	1,753,734 (28.9)	2,868,987 (47.3)	3,201,664 (52.7)

The table excludes acreage in the GIS database describing landforms (lava, lakes, playas), disturbed lands (agriculture, urban) and disturbed plant communities (non-native grassland, ruderal).
Total in area excludes military lands.
Existing conservation includes ACECs, Wilderness, National Parks, State Parks, CDFG Ecological Reserves.
New conservation includes the HCA for this alternative. Los Angeles County SEAs are excluded.
Potential loss includes areas not under specific conservation and available for development or other use. Actual loss of these communities is dependent on location, development trends and land ownership.

4.2.2.2 Desert Tortoise

This section describes the environmental consequences of implementing minimization and mitigation measures identified in Alternative A. A brief summary statement is given for major components of the alternative, followed by one or more tables in which detailed descriptions of environmental consequences are given. This information is then used to assess the significance of impacts, as identified in CEQA and NEPA guidelines. Finally, overall benefits and residual impacts are assessed to see if regulatory standards for minimizing and mitigating take would be achieved. Table 4-5 presents the assumptions that apply to the analysis given in this section.

Table 4-5
Assumptions Regarding Analysis of Benefits and Residual Impacts

CATEGORY	ASSUMPTIONS
General	Unless otherwise noted, all discussion pertains to: • Impacts resulting from implementing Alternative A • Desert tortoises (i.e., habitat, densities, mortality, and conservation of tortoises) • Private and public[2] lands, as specified, in DWMAs, except as noted.
Benefits and Residual Impacts	• Benefits are those environmental consequences that promote, facilitate, and enhance tortoise conservation, recovery, and achieving minimization and mitigation standards • Residual impacts are environmental consequences that detract from, undermine, and hinder tortoise conservation, recovery, and the achievement of minimization and mitigation standards • Every attempt has been made to provide sufficient information, and particularly empirical data, that would allow the general public and regulatory agencies to independently assess if conclusions given herein are supported by the best scientific information available • Unless otherwise noted, statements such as "provides for better protection" and "results in more impacts" are relative to current management; in general, improvements over current

2 Unless otherwise specified, "public lands" refers to lands managed by the BLM, and would exclude military, NPS, and other federally - managed lands.

CATEGORY	ASSUMPTIONS
	management constitute "benefits" • Some prescriptions may lead to poor implementation, misinterpretation, and foreseeable conflicts, as they fail to indicate how other current management would need to be modified to avoid conflicts; these consequences are reported under "residual impacts"
Authorized versus Unauthorized Activities	• "Authorized activities" are those management actions that provide for new and modified uses specifieally identified in the alternative; only those impacts that result from authorized activities are analyzed, and are referred to as "authorized impacts" • "Unauthorized activities" are those on-going uses and illegal activities that would not be authorized by the alternative; such "unauthorized impacts" may result, but are not analyzed • In assessing the alternative's potential to achieve minimization and mitigation standards, only "authorized impacts" are included; "unauthorized impacts" are not counted against meeting these standards

Establish Four DWMAs: Alternative A would result in a CDCA Plan amendment creating four new DWMAs, which would be managed for the conservation and recovery of tortoises and provide a means to achieve regulatory minimization and mitigation standards. The benefits and residual impacts associated with the proposed configuration of the four DWMAs are summarized in Table 4-6.

Table 4-6
Benefits and Residual Impacts of DWMA Designation and Configuration

BENEFITS	RESIDUAL IMPACTS
Recent and Current Tortoise Occurrence **Includes**: • 2,307 mi^2 (21% of the 11,134 mi^2 2002 tortoise range) within *four* DWMAs[3] • Good representation in central part of 2002 range • 427 of 563 mi^2 (76%) of higher density areas • 289 of 424 (68%) observed tortoises[4] • 2,115 mi^2 (96%) of USFWS critical habitat • 856 mi^2 of BLM Category I (96%) and 317 mi^2 of Category II (87%) habitats	Recent and Current Tortoise Occurrence **Does not include**: • 8,827 mi^2 (79% of the 11,134 mi^2 2002 tortoise range) • Poor representation in periphery of range • 136 mi^2 (24%) of higher density areas • 135 of 424 (32%) observed tortoises • 90 mi^2 (4%) of USFWS critical habitat[5] • 38 mi^2 of BLM Category I (4%) and 47 mi^2 of Category II (13%) habitats
Land Management Within DWMAs • Establishes context for implementing conservation measures in DWMAs versus ITAs • Land base is not within city limits or Inyo County, and only 25 mi^2 in Los Angeles County, so non-participation by these jurisdictions would not affect DWMA size or location	Land Management Within DWMAs • Non-participation by local jurisdictions and/or agencies could result in fewer compensation fees, and inconsistent regulatory approach that, cumulatively, could constitute an adverse impact to the conservation strategy

[3] The 2,307 mi^2 tortoise conservation area includes 773 mi^2 in the Fremont-Kramer, 963 mi^2 in the Superior-Cronese, 388 mi^2 in the Ord-Rodman, and 183 mi^2 in the Pinto Mountain DWMAs.

[4] The 424 tortoises are those live animals for which UTM coordinate information was available. The actual number of tortoises may be somewhat higher. For example, although 275 tortoises were observed during sign count surveys, coordinate information was available for only 261. Even so, the same comparisons are given in all tables that follow.

[5] Critical habitat acreage does not include components within Edwards Air Force Base, China Lake, and Fort Irwin; but does include the Cuddeback Gunnery Range and the Nebo Logistics Base. Therefore, for this comparison and ones that follow, the acreage is the critical habitat outside military installations.

BENEFITS	RESIDUAL IMPACTS
• Management facilitated by: • 1,595 mi^2 of public lands • 391 mi^2 (inclusive of private and public lands) of wilderness management	• Management not facilitated by 664 mi^2 of private lands
Land Management Adjacent to DWMAs • Mutual benefits for DWMAs and: • Critical habitat at Edwards AFB • Tortoise management area at China Lake NAWS • JTNP management adjacent to Pinto Mountain DWMA	Land Management Adjacent to DWMAs • Impacts on DWMA due to proximity of: • Fort Irwin expansion area • BLM OHV Open Areas • Urban interface at Barstow, Silver Lakes, Lucerne Valley, and other areas; DWMA configuration fails to adequately protect 67 mi^2 of higher density tortoise areas occurring in the Stoddard and Johnson Valley open areas.
Federal Permitting • The standardized approach to provide for programmatic take authorization of private projects would contribute significantly to the conservation function of Section 10(a) take authorization: • Excepting single-family development, every project site would be surveyed to move tortoises from harm's way, which is a significant improvement over current management Significant beneficial impact • Would replace current management where individual proponents assume responsibility for conservation efforts on a case-by-case basis that would be better applied at the regional level • Would eliminate permitting delays (currently 1 to 3 years), result in better compliance with FESA, and garner broader public support, all of which would benefit conservation goals Significant beneficial impact • Establishing specified management areas, defining standards, and applying them in a consistent manner would substantially contribute to the conservation function of Section 7 take authorization • Standard BMPs would be applied by the BLM, and USFWS could use them for other non-military, federal lead agencies (i.e., Federal Highway Administration, Dept. of Education, etc.) • DWMA prescriptions would provide for substantially more protection than BLM Category I, II, & III habitats, critical habitat, and other designations • Reporting and tracking impacts on likely occupied (Survey Area) and unoccupied (No Survey Area) habitats would provide for more resolution to determine actual take of tortoises versus loss of unoccupied habitats	Federal Permitting

BENEFITS	RESIDUAL IMPACTS
State Permitting • New programs would provide CDFG with a standard approach for authorizing take, which would minimize inconsistencies among regional offices, and result in broader public support of the conservation program • CDFG would issue a single 2081 incidental take permit that would apply to all participating jurisdictions. • Advantages associated with federal permitting, given above, would mostly apply to State permitting as well	State Permitting • Non-participation or failure to meet milestones by one or more jurisdictions could result in withdrawal of take authorization for all jurisdictions, if effective implementation of conservation strategy would be precluded.
Compensation & Fee Structure • Fees to mitigate authorized impacts on private land would be systematically applied to implement the conservation strategy on all lands, thereby augmenting agency budgets to fund implementation of measures • Would result in consistent, unified mitigation structure that would avoid current inconsistent approaches among and within permitting authorities, thereby enhancing public support of the conservation strategy	Compensation & Fee Structure
Compensation & Fee Structure • Compensation would be commensurate with the severity, type, and location of authorized impacts, which would provide for take and habitat loss that would not exceed the level of conservation provided for in return: • 5:1 compensation in DWMAs would provide for mitigation of direct and indirect impacts in the conservation area; • 1:1 compensation in designated areas constituting occupied and otherwise suitable habitats in the ITA would provide for mitigation of direct impacts, minimize impacts in the short-term, but not minimize indirect impacts in the long-term • ½:1 compensation in designated areas constituting degraded habitats, which may support occasional animals and mostly unsuitable habitat in the ITA, would provide for mitigation of indirect impacts that would result in nearby DWMAs as urban population growth is accommodated by Section 10 take authorization Significant beneficial impact	Compensation & Fee Structure

Establishing and managing DWMAs for tortoise conservation and recovery would constitute a significant beneficial impact. These areas would be specifically identified for tortoise conservation, which would better serve to direct BLM management relative to current management (see next table and discussion that follows). Since this designation would be in place for at least the next 30 years, the designation would provide for better adaptive management. This is extremely important in light of recent information suggesting that, even within DWMAs, tortoises are susceptible to catastrophic declines that have been shown to decimate the population. The designation would facilitate head starting programs, which may be essential to repopulate areas that been heavily impacted by both recent and less recent declines.

With the exception of a few regions that are mostly comprised of private land or are not contiguous to proposed DWMAs, most of the "best" tortoise habitat would be included in this alternative's DWMAs. The DWMAs fail to capture higher tortoise concentration areas in the Brisbane Valley, Stoddard Valley Open Area, and Johnson Valley Open Area, but still capture 427 mi^2 of the 563 mi^2 (76%) found within the planning area. Defined boundaries would enhance land managers' abilities to implement conservation programs and provide for better law enforcement.

DWMAs were not identified relative to county boundaries, so they would still be designated within the boundary of a non-participating county. In such a case, the county would not be obligated to implement protective measures. Proponents of private projects in that county would not receive benefits of streamlined permitting and reduced costs, and the county would be required to permit projects on a case-by-case basis, as in the current situation. Protective measures would still apply on public lands within that jurisdiction. No DWMAs are proposed within city limits.

Designate DWMAs as ACECs: Alternative A proposes a CDCA Plan Amendment to designate public lands within DWMAs as ACECs. The West Mojave Plan would serve as the ACEC Management Plan, which identifies "...aggressive management actions to halt and reverse declining trends and to ensure the long-term maintenance of these critical fish and wildlife resources;" and to "...ensure that protective measures receive priority with regards to preparation, implementation, and funding" (CDCA Plan). The benefits and residual impacts associated with new ACEC management by the BLM are summarized in Table 4-7.

Table 4-7
Benefits and Residual Impacts of Designation and Management of DWMAs as ACECs

BENEFITS	RESIDUAL IMPACTS
Size Relative to the Existing Tortoise ACEC • Net increase of 1,555 mi^2 of public lands within ACECs established expressly to protect tortoises, which is 39 times larger than the only existing one (DTNA at 40 mi^2). This represents an evolutionary improvement in management, building upon the CDCA Plan's crucial habitat and Category I and II habitat designations, and USFWS critical habitat.	Critical Habitat versus New DWMAs • Until such time as critical habitat boundaries are modified to conform to DWMA boundaries, a management problem could exist. Interim measures are not identified to resolve foreseeable conflicts where critical habitat would occur outside DWMAs and non-critical habitat occurred inside DWMAs. It is unknown how USFWS' "adverse modification" determination would apply to non-critical habitats in DWMAs.

BENEFITS	RESIDUAL IMPACTS
BLM ACEC Management • Modifying existing ACEC management plans to be consistent with new prescriptions would result in fewer management conflicts • The designation and programmatic prescriptions would better serve for consistency between the Ridgecrest and Barstow field offices of the BLM, which manage all of the Fremont-Kramer (Ridgecrest) and the other three DWMAs to the east (Barstow) • New ACEC prescriptions would provide for more protection on public lands than is provided for under guidelines for Class M or unclassified public lands	BLM ACEC Management
BLM Management of Category I, II, & III Habitat • New ACEC prescriptions would replace BLM Category I & II habitat management goals; new prescriptions are specific, scheduled actions that would be implemented immediately and function in the long-term, which would improve BLM management. • All public lands within DWMAs would be reclassified as Category I Habitat. This would not substantially change management of 1,173 mi^2 of Category I & II habitats, but would result in somewhat better conservation management on 132 mi^2 (10%) of Category III Habitat in DWMAs	BLM Management of Category I, II, & III Habitat • 85 mi^2 of existing Category I and II habitats on public land outside DWMAs would be changed to Category III, replacing relatively protective goals (maintaining and/or increasing stable, viable populations in Category I & II) with less protective ones (limit declines through mitigation in Category III)
Plan Implementation • Importantly, BLM is obligated by the CDCA Plan to prioritize funding for programs driven by ACEC management, which would ensure that limited funding and staff time are focused in areas where tortoise conservation would be most meaningful • Many prescriptions would be the same for BLM and private jurisdictions, which would provide a consistent unified approach to minimize and mitigate impacts across multiple jurisdictions • The West Mojave Implementation Plan (Appendix C) identifies specific instructions and timeframes that would govern planning for and implementation of those measures that require actions following plan adoption • Importantly, milestones and reporting requirements would establish the framework for USFWS and CDFG to ensure that the overall program is being implemented and functioning as intended; strong incentive to implement measures on public lands, as city and county take authorization could be withdrawn if milestones are not met. Significant beneficial impact.	Plan Implementation

ACEC management would constitute a significant beneficial impact relative to BLM management under the current habitat classification. It would augment and refine protection ostensibly provided by the critical habitat designation. ACEC prescriptions would serve as

specified management actions that are much more protective than class guidelines given in the CDCA Plan. The alternative would result in an ACEC that is 39 times larger than the DTNA, which is the only current ACEC managed for tortoises. Specified prescriptions would strengthen protection in places where the Class M and unclassified public lands guidelines would fail to do so. Although the fee structure pertains to both private and public lands, it would ultimately result in more income for management programs on BLM-managed lands. Importantly, BLM managers would be responsible for considering and implementing ACEC prescriptions as a relatively higher priority, as directed by the CDCA Plan.

BLM Multiple Use Class Designations: Alternative A would result in one change in current BLM Multiple Use Classes in DWMAs: lands currently designated as Class M and unclassified would be changed to Class L. Specific allowances and restrictions that may significantly contribute to or detract from tortoise conservation are given in Appendix L, CDCA Plan, Element Guidelines. Table 4-8 summarizes the beneficial impacts of maintaining Class L and adverse impacts of maintaining Class M and unclassified public lands.

Table 4-8
Benefits and Residual Impacts of Maintaining Current Multiple Use Classes in DWMAs

BENEFITS	RESIDUAL IMPACTS
• Class L lands would be managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.	
ACEC Prescriptions Supercede Class M and unclassified public lands • Formal ACEC Management Prescriptions that would provide more protection than Class M and unclassified public lands guidelines affect the following uses[6]: plant harvesting, livestock grazing, motorized vehicle access, recreation, and waste disposal	ACEC Prescriptions Supercede Class M and unclassified public lands • Would allow for the following types of development and uses on unclassified public lands in DWMAs: new agriculture, including biosolids fields; development of nuclear and fossil fuel power plants; discretionary approval of routes by BLM Field Office Manager without level of review called for in Class L; recreational events on "existing" routes of travel as opposed to "approved" routes of travel; and pitting, starting, finishing, and spectator areas would be allowed
• 220 mi^2 (52%) of higher tortoise densities found in DWMAs would be managed as Class L	• 25 mi^2 (4%) of higher tortoise densities occur on unclassified public lands

Changing Class M and unclassified lands in DWMAs to Class L would prevent adverse impacts. Some of the very highest tortoise sign counts occur north of Hinkley, in the Mud Hills/Water Valley area, which currently are Class M. Portions of the three tortoise concentration areas in the Ord-Rodman DWMA, also currently designated as Class M, would be reclassified to Class L. The change to Class L could preclude development that is inconsistent with tortoise conservation, since none of the specific ACEC management prescriptions, standing

[6] General categories are given for beneficial and adverse impacts; specific allowances and restrictions are given in Appendix L. Formal ACEC Management Prescriptions that would augment Class M and unclassified public land management are identified in pertinent sections, and would require CDCA Plan amendment.

alone, alleviate the potential for these developments to occur. Depending on the type of development and the location, there could have been the potential for significant impacts to occur in higher density areas on these lands. This possibility would be removed by the class change.

1% Allowable Ground Disturbance (1% AGD): Alternative A would authorize each participating jurisdiction to develop up to one percent of its land base within associated DWMAs. The benefits and residual impacts of this program are summarized in Table 4-9.

Table 4-9
Benefits and Residual Impacts of 1% Allowable Ground Disturbance

BENEFITS	RESIDUAL IMPACTS
Function to Minimize Impacts • The 1% AGD would ensure that habitat loss in DWMAs would not exceed the 23 mi^2 authorized • Implementation Team would annually assess habitat loss within each jurisdiction, which would ensure that impacts in DWMAs do not exceed authorized levels • Would ensure that authorized loss of habitat (Survey Area of 1,863 mi^2 in the ITA outside DWMAs[7] and 23 mi^2 in DWMAs) would not exceed 1,886 mi^2, which compares to 2,307 mi^2 in DWMAs, intended to offset authorized impacts • The above numbers are important in that they indicate there would be 2,307 mi^2 of conservation area compared to 1,886 mi^2 of take area; the conservation area, then, would be 421 mi^2 larger than the take area, and as described in many places, constitute higher quality habitats than those lost from the ITA • Would minimize and distribute take in DWMAs more efficaciously than if there were no limit or if take was allocated on a region-wide basis, irrespective of jurisdictions	Function to Minimize Impacts • Would not function in the long-term to minimize indirect impacts of authorized activities [e.g., as when a tortoise is crushed by project-related traffic (indirect impact) subsequent to development of the quarry site and road construction (direct impact)] • Does nothing to regulate authorized uses on public lands, as it would only pertain to projects resulting in authorized ground disturbances
• On a regional scale, would ensure that all authorized development would not occur in a single jurisdiction, which would be possible if the AGD were allocated throughout DWMAs, as opposed to per jurisdiction	• On a local scale, could allow clustered development within a given jurisdiction to extirpate local tortoise populations, sever critical linkages, etc. • Does not recognize that there are higher density areas that have not apparently been affected by newer and older die-off regions; would have been more effective if differentially applied to avoid such areas

If implemented as envisioned, the 1% AGD concept would provide for a significant beneficial impact. Alternative A, however, lacks guidelines that minimized the likelihood of losing local tortoise populations to large-scale clustered development. Nor does it prevent

[7] The 1,863 acre tortoise incidental take area is derived as follows: includes all private lands outside DWMAs that are within the 2002 tortoise range; excludes No Survey Areas, where tortoises are presumed absent, and take is not anticipated; nor does it include BLM lands, which are not identified for unlimited authorized take. The BLM would still be obligated to consult with the USFWS for development on public lands, so they are not included in the ITA take acreage.

development in higher concentration areas that have not, thus far, experienced detectable regional die-offs. This could affect localized tortoise occurrences, depending on size and location of the development, but this would not be significant in the context of regional tortoise populations.

Private Land Acquisition and Public Land Disposal: Alternative A identifies primary goals for land acquisition, without specifying how, when, or where acquisition would occur. There is a general assumption that newly acquired private lands in DWMAs would be transferred to the BLM, which would be responsible for implementing protective measures. Given the lack of a more specific acquisition program, and assuming BLM management of newly acquired lands, benefits and residual impacts are presented in Table 4-10 as they would occur if acquisition occurred under the given scenarios.

Table 4-10
Benefits and Residual Impacts of Private Land Acquisition and Public Land Disposal

BENEFITS	RESIDUAL IMPACTS
Acquisition Priorities • Provides data that would allow BLM to acquire private lands that would most likely alleviate observable human impacts and promote conservation • The Implementation Team would prioritize acquisition based on tortoise density, resulting land consolidation, and facilitation of conservation programs to be implemented • Identifies general acquisition goals and specific protective measures that would promote tortoise conservation	Acquisition Priorities
BLM Management • Would facilitate signing, fencing, predator management, and other programs • Would allow for expanded law enforcement capabilities • Would reduce likelihood of new residential and related urban development occurring in DWMAs (i.e., smaller 1% AGD on private lands, which would more likely be developed than public lands) • Would provide for benefits given in other tables such as mining, utilities, etc.	BLM Management • Compensation fees by themselves would be insufficient to implement all programs otherwise facilitated by consolidated public land ownership; no provisions are identified to indicate how BLM's budget would be supplemented to ensure timely implementation of protective measures • Would facilitate mine development on newly acquired public lands if mineral entry is not withdrawn
BLM Land Tenure Adjustment (LTA) • Would provide for new context for land tenure adjustment to promote tortoise conservation in DWMAs • Ensuring that all lands within DWMAs are identified for retention or consolidation (i.e., no disposal zones) would ensure no transferal of public lands to private ownership, which would benefit the conservation program	BLM Land Tenure Adjustment (LTA)

BENEFITS	RESIDUAL IMPACTS
Motorized Vehicle Access • Facilitates route designation and implementation of route closures on existing public lands • Ensures that route designation on newly acquired lands would occur in a timely manner and ultimately benefit the conservation program	Motorized Vehicle Access

Agriculture: Alternative A would not authorize new agricultural development on BLM Class L lands. However, agriculture may be allowed on public and private lands in Class M and unclassified public lands, including those within DWMAs. The benefits and residual impacts resulting from agricultural development are listed in Table 4-11.

Table 4-11
Benefits and Residual Impacts of New Agricultural Development

BENEFITS	RESIDUAL IMPACTS
• 1% AGD would apply to new agricultural development on BLM Class M and unclassified public lands in DWMAs	• Unchanged current management would allow agricultural development on BLM Class M and unclassified public lands in DWMAs, some of which occurs in higher density areas • Agricultural development could occur on private lands in DWMAs without benefit of clearance surveys or implementation of BMPs

The only existing agricultural development in DWMAs occurs around Harper Lake and in the Fremont Valley. Most active agriculture occurs in the Antelope Valley, Mojave Valley and along the Mojave River, in the tortoise ITA. Although agriculture may be allowed on Class M and unclassified public lands and is allowed without permits on private lands, it is unlikely that new areas in DWMAs would be planted in crops. However, establishing new biosolids fields (animal waste products spread over the land to produce fertilizer) is a form of agriculture that could occur and result in unregulated direct and indirect impacts to DWMAs. Such fields already occur in the western part of Fremont Valley, near Koehn Dry Lake. Any new biosolids fields proposed to be established in DWMAs would be considered on a case-by-case basis through a process subject to CEQA review.

Commercial Filming: Alternative A would result in no changes to current BLM management of commercial filming on public lands. Filming on private lands in DWMAs would be allowed, and subject to new protective measures. Benefits and residual impacts are described in Table 4-12.

Table 4-12
Benefits and Residual Impacts of Commercial Filming Activities

BENEFITS	RESIDUAL IMPACTS
• Would result in programmatic implementation of protective measures on private lands, which currently do not exist • Would result in maps and brochures that direct filming impacts away from DWMAs and higher density areas to non-DWMA lands and lower density areas	• Allows filming activities in higher density tortoise areas, particularly in DWMAs

Commercial filming is already regulated under BLM management on public lands, and this alternative would strengthen protection on private lands both inside and outside DWMAs.

Construction: Alternative A would provide incidental take authorization for miscellaneous construction activities in DWMAs. The 1% AGD concept, construction of roads and utilities, and development of agriculture, mines, and landfills are related topics discussed in other sections. This section describes area designations, protective measures, and the benefits and residual impacts that would result in DWMAs, as described in Table 4-13.

Table 4-13
Benefits and Residual Impacts of New Construction Activities

BENEFITS	RESIDUAL IMPACTS
• Fee compensation program, 1% AGD, clearance surveys in designated Survey Areas (including all DWMAs), implementation of BMPs, and other programs would result in significant beneficial impacts, resulting in fewer direct impacts in the ITA, and fewer direct and indirect impacts in DWMAs	• New construction of landing strips and airports, and new nuclear and fossil fuel power plants, would be allowed on BLM-designated Class M and unclassified public lands, but would not be allowed on Class L lands. Given the coincidental occurrence of Class M and unclassified public lands with most of the habitat supporting the highest tortoise densities, this type of new construction would be allowed in areas known to support the highest densities of tortoises
• Would marginally improve take avoidance during construction of single-family residences in DWMAs, which is not currently provided for • Would require reconnaissance surveys for projects with multiple alternatives to help choose the alternative with the fewest impacts	• Allows for construction of single-family residences in Survey Areas without clearance surveys, BMP implementation, or mandatory reporting of the number of tortoises affected, which is a continuation of current management, but not likely a significant impact, as most homes would be constructed in No Survey Areas and 1/2:1 compensation areas
• Would provide for consistent standards being implemented across multiple jurisdictions that would improve current management, as described elsewhere	• Level 2 BMPs would be restricted to DWMAs and SRAs, but would not be applied to other tortoise concentration areas outside the two SRAs

Minimization and mitigation measures that would apply to new construction in DWMAs would result in significant beneficial impacts, as follow. All undeveloped lands in DWMAs would be designated as tortoise Survey Areas, where all tortoises would be moved out of harm's way prior to ground disturbance. Relatively more protective Level 2 BMPs would be applied to all new construction projects in DWMAs. Where more than one alternative site would satisfy a proponent's project requirements, reconnaissance surveys would be performed. The proponent

would consult with the Implementation Team to choose the alternative that would result in the fewest impacts to tortoises and still satisfy the proponent's needs.

Current take authorization under Section 10 requires that proponents acquire a 10(a) permit based on results of presence/absence surveys, and that protective measures given in the HCP function to minimize and mitigate impacts when they are implemented several months or years later. Whereas this has resulted in compensation for lost habitats, it has not necessarily resulted in immediate tortoise protection, as no tortoises have been handled on any of the nine projects permitted thus far. Under new management, tortoises would be moved from harm's way *where they occur*, as opposed to where they *likely* occur. This programmatic approach would avoid significant impacts, provide for a more streamlined permitting process, and ultimately benefit both project proponents and tortoise conservation.

Disease Management: Too little is known about tortoise disease to identify a functional disease management plan. Enhanced education and law enforcement would have beneficial effects, depending on how and where those actions are implemented. Alternative A continues current management, which is to have local BLM, CDFG, and USFWS staffs participate in MOG TAC programs and meetings on disease. It also presents a disease management plan, although it assigns a relatively lower priority to implementation of this plan. Strengths and weakness associated with the proposed disease management plan[8] are given in Table 4-14.

Table 4-14
Benefits and Residual Impacts of Disease Management

BENEFITS	RESIDUAL IMPACTS
• Would serve as a place-holder that ensures that the latest "acceptable" (from either USFWS and/or MOG) disease protocol becomes part of future management • The "Disease Management Trust Fund" would ensure that funds are ear-marked and immediately available to expeditiously implement new disease management actions, which could not occur in the absence of such a fund	• Recent evidence suggests that URTD may rapidly spread through the population, which may be particularly adverse in DWMAs where higher density areas are concentrated • Alternative does not provide funds for researchers to target interface areas that appear to be the leading front of URTD, and to study subpopulations (i.e., south of Mud Hills, where tortoises do not appear to (yet) be affected by regional die-offs • Alternative would have been strengthened by fencing culverts and strategically located roads.
Positive Aspects of Alternative • If implemented, would result in eliminating biosolid fields from DWMAs (i.e., existing field in Fremont Valley) and prohibiting new biosolid fields • Monitoring potentially toxic elements from dust sources would help to test the hypothesis that dust sources are (or are not) responsible for elevated levels of these elements • Monitoring tortoise health could lead to a better	Negative Aspects of Alternative • *Quarantine management* implies that the transmission of URTD occurs along some "front" (i.e., as in spreading edge of a fire), that catastrophic die-offs are known to be caused by disease, and that erecting fences would stop disease spread and die-offs, none of which is supported by current knowledge. The approach would result in additional habitat fragmentation, and would do nothing to repatriate tortoises inside fenced areas where the

[8] Dr. Michael Connor, Executive Director of the Desert Tortoise Preserve Committee, provided the basic outline for disease management that is assessed in this table. The outline was provided to the WMP team during Task Group 1 planning, at a time when "coordination with the MOG" was the only identified proposal being considered.

BENEFITS	RESIDUAL IMPACTS
understanding of the cause of catastrophic die-offs, particularly if die-offs occur where there is no clinical evidence of disease • Epidemiological studies of herpesvirus is a very important, relatively straight-forward research project that would result in an ELISA test, which has pragmatic uses in determining the distribution and prevalence of this disease • Field-based research into URTD, herpesvirus, and other diseases would be very useful, as most previous studies have been conducted in laboratory settings	"trigger has already been met."
Measures already covered by other programs • Fencing DWMA boundaries in appropriate places, implementing head starting, education, improving habitat quality by reducing available routes and reducing/eliminating ground disturbance, salvage protocols for ill and dying tortoises are already included in other programs • Increased law enforcement in higher density areas may result in better public education and apprehending members of the public attempting to release sick pets into the new DWMA, conservation areas	Measures for which there are no foreseeable benefits • Eliminating biosolid fields to reduce sources of excess nitrogen is speculative and ignores the fact that atmospheric nitrogen is the primary source of deposition, which would not be reduced by the action • Phylogenetic studies have already determined that West Mojave tortoises are relatively homogeneous (Dr. Morafka, pers. comm.), and there is no identifiable practical application of new results to justify spending funds on such studies • *Experimental interventions* would result in manipulation of wild animals where there is no clear evidence that additional food or water would make animals any more (or less) susceptible to disease; it may result in negative effects of having wild animals rely on resources that are naturally limiting; even if successful, there is no pragmatic means of applying results to regional populations.

The alternative provides for maintained communication with the MOG and, except for contingency funding, would provide no new means of counteracting URTD, herpesvirus, and other tortoise disease. This is not a failing of the alternative, so much as a statement of how little is known, and how little can therefore be done with regards to addressing disease threats. The Disease Management Trust Fund is considered one of the most pragmatic ways to ensure that break-through disease management tools (presently unidentified) could be implemented expeditiously. Spending money at the present time in the guise of "disease management" would detract from other conservation programs with more-or-less known results (i.e., highway fencing, increased law enforcement), and result in premature expenditure of limited funds without any scientific basis to support the expenditure. "Disease research," on the other hand, remains a high priority item needed to identify pragmatic management tools.

Older and more recent die-off regions, if associated with spread of disease, suggest that URTD or some yet unidentified disease may spread rapidly through denser tortoise populations. A number of measures identified above in the right-hand column may have strengthened disease management, but are not part of the alternative (see, however, Alternative F).

Drought: Alternative A does not directly address the threat of either short- or long-term drought. However, some prescriptions would enhance tortoise conservation during drought periods. Benefits and residual impacts are summarized in Table 4-15.

Table 4-15
Benefits and Residual Impacts of Measures to Counteract Drought

BENEFITS	RESIDUAL IMPACTS
Motorized Vehicle Access • The single most effective measure to alleviate human impacts during time of drought is to minimize vehicle use within washes, which would be accomplished by closing 117 of 177 linear miles (66%) of routes identified as occurring within washes in DWMAs. There are certainly more than 177 linear miles of washes in DWMAs, however, since route use would be restricted to only those routes that are designated as open, washes that are not included would not be available for vehicle use, which would be a very significant beneficial impact. • Route reductions in higher density tortoise areas in DWMAs would serve to alleviate human-induced stresses during drought periods	Motorized Vehicle Access • Alternative would not close 60 linear miles (34%) of roads in DWMAs that coincide with washes • Alternative fails to identify specific measures that would be implemented in higher density tortoise areas, which are most likely to benefit from additional protection than would be implemented during periods of prolonged drought; temporary, emergency closures of additional routes in higher density tortoise areas would have resulted in less stress than would occur with Alternative A.
Feral Dog Management • Benefits associated with feral dog management would be particularly important during periods of drought, when feral dogs may be more likely to prey of tortoises as other prey items become less available	Feral Dog Management

The alternative to allow vehicle use in only those washes designated as open is a significant beneficial impact, as it replaces a policy that allows vehicle use wherever there is evidence of prior use. In the Ord Mountain Pilot Study, about 25% of the potential routes were actually washes, with and without vehicle tracks (LaRue 1997). The current route network identifies 177 linear miles of wash routes, 117 miles of which (66%) have been identified for closure. It is very likely that the digitized routes within washes significantly underestimates the actual number of washes that are being used for vehicle travel (i.e., compared to the hydrological features identified by the Mojave Desert Ecosystem Program, for example). However, the alternative would allow for vehicle use in only those washes that are designated as open, so the non-digitized wash routes would not be available for vehicle use.

Tortoises concentrate their foraging activities around washes (Jennings 1993), often burrow in wash banks or on adjacent slopes (Baxter 1988), and may occupy burrows closer to washes during periods of drought (Circle Mountain Biological Consultants 2002). Where OHV use in washes is common, tortoises are more at risk. They are already physiologically stressed by lack of both food and water. Since they are less active during drought but often lay at least one clutch of eggs, both animals and nests are in harm's way where heavy vehicle use occurs. Shrubs often take on a dull appearance and desiccate (dry out) during a single year of low rainfall. Because wash-side growth is denser than growth in adjacent open lands, there is increased risk of fire in washes where camping, shooting, and vehicle use is more common. Minimizing these and

numerous other impacts (see Chapter 3) is perhaps the only practical thing that managers can do to minimize impacts associated with drought, and is a significant beneficial impact.

Education: Alternative A would result in hiring a subcontractor to produce and implement an education program throughout the planning area. Table 4-16 summarizes the benefits and residual impacts associated within this program.

Table 4-16
Benefits and Residual Impacts of Education Program

BENEFITS	RESIDUAL IMPACTS
• Program would result in outreach to local schools, museums, user groups to advise them of the conservation efforts and facilitate cooperation to achieve goals	
• Contractor would develop a standard education program to be given to construction workers, which would replace the current situation of case-by-case education programs	
• The education program would target pet owners and inform them that pet tortoises, particularly sick ones, should not be released into the newly established conservation areas, which may have resulted in the incidence of URTD outbreaks at the DTNA in the mid to late 1980's	

The education program would be a vital part of the overall conservation strategy. The current alternative provides only guidelines, which would indicate to the education subcontractor the types of programs that should be developed and existing programs that should be facilitated. Some programs, such as signing, fencing, and working with the Silver Lakes Association to minimize impacts of that community would be implemented immediately in order to ensure that those programs function as intended. The ultimate effectiveness of the program would be very difficult to gauge, although specific milestones would ensure that the program is being developed as envisioned.

Energy and Mineral Development: Benefits and residual impacts associated with the energy and mineral development are presented in Table 4-17.

Table 4-17
Benefits and Residual Impacts of Energy and Mineral Development

BENEFITS	RESIDUAL IMPACTS
New Development • Development of new mines and expansion of existing mines would be subject to the 1% AGD, compensation fees, tortoise clearance surveys, and implementation of BMPs.	New and Existing Development • Does not adequately address how existing and new contamination associated with mining activities would be remedied and avoided, respectively, in DWMAs • Fails to indicate how impacts associated with new haul roads would be minimized or avoided

BENEFITS	RESIDUAL IMPACTS
New Exploration • Identifies standards for new mineral exploration that would minimize impacts and require mitigation if temporary impacts are not remedied in a timely manner • Off-road travel, anticipated ground disturbance, and minimization measures would only be allowed under a BLM-approved Plan of Operations for all mines within DWMAs, which would result in higher scrutiny on a case-by-case basis to ensure that protective measures are identified and implemented as intended • Would provide incentive to ensure that exploratory activities result in only temporary impacts (e.g., access roads and drill sites reclaimed within 120 days and activities appropriately monitored, otherwise would require compensation and be counted against the 1% AGD)	New Exploration
Habitat Credit Component • Habitat credit component program would facilitate rehabilitation of existing mine sites in DWMAs, as given in Table 4-23.	Habitat Credit Component • See discussion in Table 4-23.

Although it has been suggested that mines may be the point source for heavy metals found in sick tortoises, the evidence is inconclusive. Therefore it is unknown how existing and new mines may indirectly affect tortoises. Direct impacts would be avoided and effectively minimized and mitigated by implementing the measures listed above in the left column; protection against indirect impacts remains unknown.

Feral Dog Management: The alternative identifies the need to draft a Feral Dog Management Plan to address this persisting threat, which is likely to increase as urban development and casual desert use increases. Management would be facilitated if it was implemented on both private and public lands, but the mechanism to do this (perhaps an MOU among appropriate entities) has not been identified (see Table 4-18).

Table 4-18
Benefits and Residual Impacts of Feral Dog Management

BENEFITS	RESIDUAL IMPACTS
• The Implementation Team would work with BLM and private law enforcement agencies to produce a Feral Dog Management Plan	• Given the many programs requiring immediate attention, and the lack of good distributional data for feral dogs, this impact is likely to occur even if the management plan is completed in a timely manner

Feral dogs will continue to be a problem as the urban interface expands and ultimately contacts DWMA boundaries. Law enforcement agencies have the authority to remove feral dogs, as regulated, but are not specifically tasked to remove them at present. Given that law enforcement and recreation technicians would be focused on management in DWMAs, there would be opportunities to implement management as identified in the FDMP.

Fire Management: Alternative A would provide for a few new protective measures for fighting fires on public lands in DWMAs, based on the assumption that current management would suffice to continue to minimize impacts but that recent data show regions where modified activities would be prudent. Table 4-19 describes resulting benefits and residual impacts.

Table 4-19
Benefits and Residual Impacts of Fire Management

BENEFITS	RESIDUAL IMPACTS
• Existing programs would continue to be implemented on public lands with the intent of minimizing fire fighting impacts	• The current alternative would not function to minimize impacts on private lands, as it would pertain to fire suppression activities on public lands, only • Alternative fails to indicate how new information (i.e., locations of higher density areas) would be incorporated into BLM current management, or if there would be specific differences between fire fighting restrictions inside and outside DWMAs

Cattle Grazing: Alternative A would result in new regulations and management directions affecting cattle grazing on four BLM-managed allotments in DWMAs. Table 4-20 describes benefits and residual impacts resulting from new management areas and prescriptions.

Table 4-20
Benefits and Residual Impacts of Cattle Grazing on BLM Allotments

BENEFITS	RESIDUAL IMPACTS
• Would provide for voluntary relinquishment of cattle allotments to facilitate conservation of tortoises and other covered species, which is not currently provided for in CDCA Plan; would minimize the amount of additional regulatory work that results, thereby freeing staff to focus on implementing measures. • All applicable ACEC Management Prescriptions would apply to relinquished cattle allotments following the two-year period required to finalize relinquishment • Alternative uses that are not compatible with DWMA management (e.g., establishing a new vehicle open area) would expressly not be allowed on relinquished allotments; conservation as provided for and regulated by Class L guidelines and new management prescriptions would prevail	
• Provides for removal of cattle from Exclusion Areas when there is less rainfall, less available annual plant forage for cattle and tortoises, and more likely competition between the two species. Acreage of exclusion areas by allotment follows: 59,368 acres within Ord; 18,051 within Cronese and 13,694 within Harper.	• Exclusion Areas are based on protecting higher density areas in DWMAs where cattle allotments overlap. Consequently, it would concentrate cattle in suitable habitats that currently support lower densities. For the conservation strategy to function, tortoises must be protected in higher density areas (accomplished) and facilitate repatriation in lower density areas (not accomplished, and possibly less likely due to concentrating cattle use)

BENEFITS	RESIDUAL IMPACTS
• Identifies a 230 pound per acre dry-weight ephemeral forage threshold that would be consistently applied to all perennial cattle allotments in DWMAs • On allotments to be actively grazed in DWMAs, an Avery-like study would be completed within five years of plan adoption to determine the allotment-specific competitive threshold; in the interim, the 230 pound threshold would be used	• The 230 pound/acre threshold was developed on the basis of studies conducted in the East Mojave, in Ivanpah Valley. Such studies have not yet been undertaken in the West Mojave. Thus, its applicability to cattle allotments in the West Mojave, and its likely success in reducing competition for limited forage, will remain uncertain until the "Avery-like" study is completed.
• Identifies a seasonal restriction during the ephemeral plant growing season, between March 15 and June 15, which would benefit adult tortoises by resulting in less forage competition during years of poor rainfall	• Fails to avoid competition between juvenile tortoises and cattle; tortoises hatching in the previous fall rely on annual forage that may appear in February, and would therefore still be exposed to competition with cattle foraging outside the scheduled time for cattle exclusion • Fails to reduce the effect of cattle trampling on hatchling tortoises, which emerge in September to October, when cattle could be put back into the Exclusion Area following the June 15 deadline
• Would effectively minimize impacts of cattle grazing in the Ord-Rodman DWMA by installing fences at strategic points along the boundary to prevent grazing outside the allotment on adjacent DWMA lands	• Although new fences would minimize cattle trespass, they would also serve to concentrate cattle grazing on the Ord-Rodman Allotment where it overlaps with the DWMA
• Would eliminate ephemeral allocation on perennial allotments, which would prohibit increased cattle use in years of good ephemeral production	• Utilization levels are general and restricted to perennial plants, which provides no focused protection for "high potassium excretion potential" plants (from Dr. Oftedahl's work) and other annual forage that is important to tortoise feeding ecology
• Would prohibit additional allocations of perennial forage consumption for cattle by eliminating most temporary non-renewable grazing permits	• As with eliminating new ephemeral allocations, Alternative A would only serve to reduce impacts to perennial plants during favorable growing seasons without specifically protecting important ephemeral forage that would continue to be authorized for grazing
• Would eliminate ephemeral grazing authorization from all allotments in DWMAs, so that current "ephemeral-perennial" allotments would be designated for perennial-use, only, which, among other things, would result in the elimination of the Pilot Knob Allotment (an ephemeral-only allotment) designation	• Would still allow for grazing of ephemeral forage that is important to tortoises and cattle
• Would require that cattle are removed within two days, which is an improvement over current standards (no timeline is specified) that would result in less carrion availability for tortoise predators	• Cattle troughs are not affected and would continue to provide an otherwise unavailable water source to tortoise predators
• Identifies new timeframes in which health assessments would be performed and results applied to identifying new management	• Health assessments were required to be completed by 2002, but have yet to be done in most allotments; proposal fails to indicate how these new timeframe requirements would result in new assessments

Grazing by cattle at Harper Lake occurs along the western edge of one of the most significant regional concentrations of tortoises in the entire planning area. The Ord Mountain Allotment is centered in such a way as to promote isolation of the three regional tortoise concentrations in the Ord-Rodman DWMA. This population is at risk to local extinction with no

opportunity for natural repatriation. The three isolated aggregations are somewhat protected from region-wide spread of disease due to manmade (grazing) and natural (mountains) barriers.

Whether applying the East Mojave-derived 230-pound standard to grazing management in the West Mojave would result in reduced forage competition will remain an open question, at least until the West Mojave "Avery study" is completed. Exclusion Zones would seemingly minimize impacts, but they also concentrate cattle in DWMAs within the Ord Mountains, and immediately adjacent to DWMAs at Harper and Cronese Lakes. Removal of ephemeral allocations and most temporary non-renewable forage allocations would allow habitats to begin recovery when conditions are favorable, but would not minimize impacts that continue to result from use by the base heard. Trespass grazing outside the Ord Mountain Allotment would be substantially controlled, but would result in concentrated use elsewhere in the Ord-Rodman DWMA.

Sheep Grazing: Alternative A would result in new regulations and management directions affecting sheep grazing on all BLM-managed allotments in DWMAs. Table 4-21 addresses benefits and residual impacts resulting from new management areas and prescriptions.

Table 4-21
Benefits and Residual Impacts of Sheep Grazing on BLM Allotments

BENEFITS	RESIDUAL IMPACTS
• Would result in elimination of 14 mi^2 of sheep grazing from the Shadow Mountains Allotment	• Fails to identify new areas outside DWMAs where lost grazing potential would be reallocated, or how those reallocations may affect other covered species
• There are currently 705 mi^2 of BLM sheep allotments in DWMAs that have not been used since the USFWS biological opinion of 1991, that would no longer be designated for sheep use, as defined in the CDCA Plan amendment; ACEC Management Prescriptions would govern new BLM-authorized uses, which would no longer include sheep grazing	
• Replaces current utilization threshold of 200 pounds ephemeral dry weight per acre to 230 pounds, although this difference wouldn't be recognizable in the field	• Applies the 230 pound threshold (which is already questionable for cattle grazing) to sheep grazing, where no forage competition studies have identified a similar threshold
• Clarifies that no more than 1,600 sheep could occur in combined bands at and following lamb removal	• Alternative does not substantially change current management, which states 1,000 adult sheep and their lambs may be banded together.

Sheep grazing would be removed from 14 mi^2 in the Shadow Mountains Allotment, which is within the southern part of the proposed Fremont-Kramer DWMA; grazing was not prohibited in this area (as on 705 mi^2 within the DWMAs) by the 1991 biological opinion because it is in Category III habitat. Sheep grazing on private lands outside DWMAs would continue to occur, and would not be minimized by this or any other alternative.

Wildlife Guzzlers: Alternative A provides for a study to see if guzzlers are affecting tortoises in such a way as to require immediate attention. Guzzlers are most likely to affect the

limited number of tortoises occurring in adjacent areas, and probably represent a small impact in the region. The proposal to inventory guzzlers, determine their direct impacts (i.e., drowning) and indirect impacts (i.e., support of local predators), and modify them accordingly would identify the problem, if any, and require a solution (see Table 4-22).

Table 4-22
Benefits and Residual Impacts of Guzzlers

BENEFITS	RESIDUAL IMPACTS
• Would provide for a study to sample quail guzzlers in DWMAs and remedy identified problems	• Until such a study is completed, guzzlers would continue to result in drowning and provide an otherwise unavailable water source to known predators

Guzzlers affect a limited number of animals, and may easily be retrofitted to prevent tortoise drowning. This alternative would assist the CDFG in better understanding and minimizing the impacts of guzzlers, which were put in the desert by the CDFG mostly in the 1960's. There are no data to indicate if local predator populations have increased in response to the water. Alternative A would effectively minimize impacts of an existing, marginal threat.

Habitat Credit Component: Alternative A would implement a program that would result in restoring degraded habitats, and serve as a secondary means for mitigating impacts. Rather than provide compensation fees to mitigate impacts, the proponent would restore degraded areas in DWMAs for the purpose of restoring suitable tortoise habitat (see Table 4-23).

Table 4-23
Benefits and Residual Impacts of Habitat Credit Component Program

BENEFITS	RESIDUAL IMPACTS
Success Criteria • The Implementation Team would identify existing impact areas to be reclaimed, which would be restricted to DWMAs or other HCAs where the authorized impact occurs • General guidelines and success criteria would be implemented to ensure that standards are being achieved that would lead to suitable habitats being recovered	Success Criteria • Successful restoration has rarely been achieved in arid landscapes, and may take decades before success or failure to be assessed
Fee Compensation Structure • Habitat restoration would still occur in the context of the compensation fee structure. Thus, one acre of habitat lost to authorized activities in a DWMA would require restoration of up to five acres under this program	Fee Compensation Structure • This program would result in restoring habitats in lieu of paying compensation fees. Therefore, depending on how often this program is used, it could result in fewer fees being collected to implement protective measures
Intended Function • This program is clearly identified as a secondary means of mitigating impacts, and would not function to replace the primary compensation structure • The Implementation Team, on an annual basis, would ensure that this program function as a secondary means of compensating impacts	Intended Function • Successfully restored habitats would be added back into the 1% AGD for the affected jurisdiction. Such a system could allow for replacement of "suitable" tortoise habitat with somewhat less valuable "restored" habitats, which could seriously undermine the function of the 1% AGD

If exercised as intended (i.e., secondary approach to mitigating impacts in lieu of fee compensation), this program would provide an excellent means to recover areas in DWMAs that are important to overall conservation goals. If used excessively, especially if not overseen carefully by the Implementing Team to ensure that success criteria were met, it would substantially detract from conservation, result in less income to implement measures, and replace occupied habitats with restored habitats that may not be occupied for decades. Tortoises rely on both annual forage and perennial plants (i.e., mostly shrubs, under which they burrow), which would take years, if ever, to become re-established. However, the program would allow for immediate loss of habitat that would have immediate, negative impacts, depending on the location.

Head Starting: Alternative A would result in implementing and conducting a pilot head starting program, which would be associated with the impacts given in Table 4-24.

Table 4-24
Benefits and Residual Impacts of Head Starting Program

BENEFITS	RESIDUAL IMPACTS
• The nursery hatchery established in the Fremont-Kramer DWMA would function in the short-term to minimize egg and hatchling predation; in the long-term the desired effect is to repopulate extirpation areas	
• Would be implemented in regions where current, depressed populations are so low that natural repopulation may not occur without this intervention	• Insufficient data exist to conclude that this program would function as intended; there is no evidence to suggest that head starting would result in increasing populations
• Insofar as possible, gravid (egg-bound) females would be taken from known impact areas (BLM open areas, ITAs, proposed development sites, etc.) and allowed to lay eggs within the hatchery, which would not remove females and potential hatchlings from protected areas (e.g., DWMAs, military bases, etc.) but would protect potential hatchlings in impact areas	

Data suggest that there are extensive areas in the northern and northwestern Fremont-Kramer DWMA where tortoises have been partially or completely extirpated. The remnant animals, if any, are widely dispersed and may not be able to find mates. It may take years to determine if the program is successful in re-establishing tortoises. Implementing a pilot study, rather than establishing multiple nurseries from the start, is a more cautious approach that would involve a minimal commitment of scarce financial resources to an untested concept. On the other hand, it carries a risk of missing an opportunity to benefit decimated populations immediately if the program proves to be highly successful.

Law Enforcement: Alternative A would result in guaranteed funding for new BLM law enforcement personnel, and would require focused monitoring and enforcement within designated DWMA boundaries. Benefits and residual impacts are given in Table 4-25.

Table 4-25
Benefits and Residual Impacts of BLM Law Enforcement

BENEFITS	RESIDUAL IMPACTS
Funding • Would provide for sufficient funding to employ new law enforcement and recreational technicians to enforce new regulations in DWMAs	
Focused Enforcement in DWMAs • New law enforcement staff would be obligated to patrol DWMAs so that constant enforcement is maintained and modified as needed to address persisting impacts • New BLM recreational technicians would supplement law enforcement, be less likely called away on other duties and emergencies, and ensure a constant educational/enforcement presence in DWMAs • Identifies guidelines that would facilitate focused enforcement in higher density tortoise areas, in higher density impact areas, adjacent to open areas that border DWMAs, and ensure that new data are used to adaptively manage law enforcement activities	Focused Enforcement in DWMAs • Though a good faith effort is implied, alternative fails to indicate how BLM would obligate its law enforcement staff to ensure this measure would be implemented. Failure to identify a mechanism could result in inconsistent implementation
Facilitated Coordination • Would result in coordination of BLM law enforcement with the Implementation Team, education subcontractor, Caltrans, local government to facilitate law enforcement actions in DWMAs on both private and public lands.	Facilitated Coordination

To be successful, a substantial portion of the conservation strategy requires increased, focused law enforcement in DWMAs. Enforcement of hunting and shooting regulations would be the only means to reduce the incidence of gunshot mortalities. Poaching, collecting for pets, and releasing captives are all activities that would continue unabated except for increased law enforcement. The program is critically dependent upon adequate funding and dedication of new personnel to natural resources patrol work in DWMAs, which the West Mojave Plan would provide.

Motorized Vehicle Access: The new route network would be adopted by CDCA Plan amendment upon issuance of the BLM's Record of Decision. Effective implementation of the network would require signing open and limited use routes, physically obstructing roads identified for closure, and other actions. An aggressive, focused education program that targets all vehicle user groups would facilitate the success of the program. The assumptions inherent to this analysis are given in Table 4-26.

Table 4-26
Assumptions Regarding Motorized Vehicle Access Analysis

CATEGORY	ASSUMPTIONS
General	Unless otherwise noted, all discussion pertains to: • Alternative A • Desert tortoises (i.e., habitat, densities, mortality, conservation, etc. of tortoises) • Public lands in DWMAs
Desired Results	• The goal is to designate and implement a route network throughout DWMAs that would provide for public access, authorized uses, and the following desired results: • Fewer losses of tortoises to crushing, poaching, pet collection, intentional vandalism, and similar activities requiring vehicle access • Less degradation and loss of occupied habitat (first priority) and suitable habitat (second priority) • Larger blocks of unfragmented habitat, which would be achieved if vehicle use is prevented on designated closed routes, does not result in increased cross-country travel in adjacent areas, and promotes recovery of suitable habitats more quickly than would naturally occur • Route closure in higher density tortoise areas is likely to provide the most benefit in terms of avoiding mortalities and other losses • Route closure in lower density tortoise areas would alleviate losses of animals that are critically important to natural repatriation
Function and Importance of DWMAs	• All public lands in DWMAs are important for tortoise conservation and recovery • Lands that currently support relatively lower tortoise densities are no less important for tortoise recovery than lands supporting relatively higher densities • Conservation management in DWMAs must meet State and federal mitigation and minimization standards to offset authorized impacts in the tortoise ITA and elsewhere • DWMAs are the primary land base on which conservation goals, recovery efforts, and mitigation standards can be achieved
Impacts to Tortoises and Habitat	• Tortoises are more likely to be negatively impacted (i.e., crushed, collected, poached, etc.) in regions supporting higher densities than in areas of lower densities • Vehicle-based impacts are proportionate to the number of existing roads in an area. Both allowed uses (e.g., vehicle use that remains on existing roads) and prohibited uses (i.e., cross-country travel outside BLM Open Areas, dumping, vandalism, collection) are more likely to occur where roads are relatively more common • Tortoises and habitat are more likely to be impacted by vehicular activities in areas below about 20% slope than in steeper areas • If left unchecked, vehicle use in areas of above-average human disturbances would continue to result in loss of tortoises, degradation of habitat, and seriously undermine conservation and recovery efforts

Given the assumptions identified above, there are likely to be both benefits and residual impacts associated with the motorized vehicle access network, as summarized in Table 4-27.

Table 4-27
Benefits and Residual Impacts of BLM's Motorized Vehicle Access Network

BENEFITS	RESIDUAL IMPACTS
Overall Importance • Designating and implementing a motorized vehicle access network in DWMAs that is supported by land use laws and compatible with tortoise recovery is the single most important management action that could be implemented to minimize the widest variety of known human impacts.	Overall Importance
For Animals and Habitat • Implementing this alternative would reduce the following impacts, and would be proportionate to the linear miles of routes closed: • Tortoises would be less susceptible to: pet collection; animals, burrows, and eggs crushed; gunshot impacts; handling that results in bladder voiding; harassment or mortality by pet dogs; poaching for ceremonial purposes; releasing pet tortoises into wild populations, which may spread disease; translocation, where tortoises are moved outside their home range into other habitats; and vandalism. • Habitats would be less susceptible to soil compaction, displacement through wind and water erosion, petroleum contamination; spread of exotic weeds, which supports spread and intensity of fire; damage and complete removal of shrubs, which reduces protective cover and burrowing opportunities; dumping (which leads to more dumping), resulting in soil contamination, food sources for predators, focal areas for illegal target shooting; increased litter and garbage used as a food source by ravens; and increased noise levels (though effects are not well known).	For Animals and Habitat • There is no clear way to assess the current or future impacts specifically associated with roads, which would be necessary to adaptively manage public lands to provide a balance between human use and tortoise conservation.
Route Reductions in Specified Regions • In *DWMAs*, the network would result in the closure of 1,855 of the 4,225 total linear miles of routes on public land, which is a 44% reduction of routes in DWMAs. This would have both immediate and long-term benefits • Within *higher density areas*, the network would result in the closure of 577 of the 1,146 total linear miles of routes in such areas, which is a 50% reduction of routes in this area. This would have immediate and long-term benefits where tortoises are most abundant. • Within *lower density areas*, the network would result in the closure of 1,278 of the 3,079 total linear miles of routes in such areas, which is a 42% reduction of routes in this area. This would have immediate benefits to habitat and long-term benefits to overall conservation • Within *above average vehicle disturbance areas*, a total of 435 of the 829 linear miles of routes would be closed, comprising about 53% of the existing routes in above average vehicle impact areas.	Route Reductions in Specified Regions • Use of the remaining 2,370 linear miles of open routes in *DWMAs*, representing 56% of existing routes in DWMAs, would continue to result in permitted and un-permitted impacts • The remaining 569 linear miles of open routes (50% in area) in *higher density areas* would continue to result in impacts. This total includes 384 miles of non-single track routes, although this is a reduction from the 439 miles open under the current (1985-87) designations. • The remaining 1,801 linear miles of open routes (58% in area) in *lower density areas* would continue to result in impacts to the few remaining animals, which are critical for re-establishing reduced or extirpated populations • The remaining 394 linear miles of open routes (47%) in *above average vehicle disturbance areas* would continue to affect tortoises

Unlike catastrophic die-offs, where the cause of death is unknown, and mammalian predation, which is widespread and may not be controllable, vehicle impacts may be controlled. Route reductions, signing and fencing programs, restriction on competitive events in DWMAs, education program, and increased law enforcement are pragmatic ways of minimizing vehicle impacts.

Given the assumptions, closure of any routes would be of some benefit to tortoise conservation. However, the effectiveness of the closures to achieve desired results is dependent on where the routes are located relative to higher and lower density tortoise areas, how soon the routes would be closed, and how well law enforcement would function to ensure traffic remains on approved routes of travel. Successful implementation must consider these and other variables, which cumulatively would provide the most substantial means of minimizing this known form of impact. If implemented as envisioned, the motorized vehicle access network would constitute a significant beneficial impact.

There are potential problems associated with route closures that could undermine the conservation value of the reduced route network. For example, the conservation value would be affected if closure results in increased illegal cross-country vehicle travel outside designated open areas, which in turn could lead to more crushed tortoises and habitat degradation. It is also possible (though not likely) that fewer routes may result in increased vehicle congestion on the remaining routes and concomitantly higher impacts in adjacent areas. These and many other impacts could be effectively avoided if BLM rangers begin to apply focused regulatory enforcement in conservation areas, which would require a major philosophical change in current enforcement practices.

Plant Harvest: Alternative A would prohibit plant harvest in DWMAs, which has the effects described by Table 4-28.

Table 4-28
Benefits and Residual Impacts of Plant Harvest

BENEFITS	RESIDUAL IMPACTS
• Would result in fewer impacts associated with plant harvest, which at this time is already minimal	

Currently, the BLM issues salvage permits that allow harvesting to occur on public lands, unless otherwise prohibited (i.e., operating a vehicle in a wilderness area to harvest plants). BLM staff indicated that very few permits are solicited. Upon issuance, permittees are informed of existing restrictions that would apply to plant harvesting. The effect of this measure would be to prohibit plant harvesting in DWMAs. This would reduce impacts associated with harvesting, which are already minimal, given how few permits are issued.

Raven Management: In 2002, the Desert Managers Group identified proactive raven management as a new, focused activity by the USFWS. Alternative A includes a set of action items identified by Dr. William Boarman that would serve as "raven management guidelines." Benefits and residual impacts of implementing Dr. Boarman's proposal are given in Table 4-29.

Table 4-29
Benefits and Residual Impacts of Raven Management

BENEFITS	RESIDUAL IMPACTS
Coordination and Participation • Implementation Team would ensure working groups assist USFWS in implementing measures where they would provide the most benefit and garner the widest public support • Participation by SCE and LADWP would ensure that protective measures are implemented for extensive reaches of existing utilities, raven salvage permits would be acquired, used, and results would be reported to the USFWS. This is particularly important in the southern portions of the Fremont-Kramer DWMA and other areas where subadults are relatively more concentrated	Coordination and Participation
Action Items • Would provide for county waste management to meet standards observed at San Bernardino County landfills • Would provide for removal of all existing illegal dump sites from DWMAs	Action Items
Landfills • No new landfills inside or within five miles of DWMAs would minimize the amount of forage and water available to common ravens where these sources would be most problematic • Assuming that hazardous and non-hazardous waste repositories constitute landfills, this provision would prohibit new repositories in Class M and unclassified public lands where guidelines would allow it • BLM's (unchanged) current management prohibits construction of new landfills on public lands, and has resulted in transferring public lands to private ownership where existing landfills occur, which is encouraged	Landfills • Proposal does nothing to minimize impacts associated with the Barstow Regional Landfill, which occurs within the Ord-Rodman DWMA.

The alternative provides a general strategy to guide raven management, rather than a list of explicit management prescriptions. Other programs (i.e., under utilities, transportation, grazing, etc.) would function to reduce sources of food and water for ravens. There is insufficient information to know if such measures (applied cumulatively or in part) would result in reduced populations or less predation on young tortoises. These are, for the most part, new actions identified to reduce a known threat. Increased raven predation would likely result from construction of new tract homes, development and expansion of new and existing mines, and other authorized activities. Populations would increase without the type of intervention provided for in the raven management guidelines.

Recreation: Though managed for tortoise conservation, DWMAs would still be available for a multitude of recreational activities. Non-consumptive recreational activities such as hiking, birdwatching, horseback riding, and photography would be expressly allowed. Hunting and target shooting would continue as currently regulated by law. Dual sport events would continue as regulated by existing USFWS biological opinions. New regulations would restrict the available area for camping, stopping, and parking to areas adjacent to designated open routes that are much narrower than current management allows. Benefits and residual impacts associated with these measures are summarized in Table 4-30.

Table 4-30
Benefits and Residual Impacts of Authorized Recreation Activities

BENEFITS	RESIDUAL IMPACTS
Multiple Use Class Designations • Staging, pitting, and camping areas associated with dual sport events would be restricted in BLM Class L areas (current management under CDCA Plan Guidelines) • Class L lands, in general, are available for relatively fewer recreational activities and low to moderate user densities • The southern half of the Stoddard-to-Johnson Valley OHV corridor occurs in Class L lands, and therefore less subject to impacts given above	Multiple Use Class Designations • Staging, pitting, and camping areas associated with dual sport events would be allowed in BLM Class M and unclassified public lands, some of which corresponds to higher-density tortoise areas • Class M lands, in general, are available for a wider array of recreational activities and moderate to high user densities; there are even fewer restrictions in unclassified public lands • The northern half of the Stoddard-to-Johnson Valley OHV corridor occurs in Class M lands, and therefore more subject to impacts given above; the Edwards Bowl area, which is unclassified public land, is very degraded and would continue to be degraded
Competitive Event Corridors • Mandatory implementation of "yellow flag" conditions paid for by the proponent for events using the Stoddard to Johnson Valley and Johnson Valley to Parker corridors would eliminate the competitive "race" nature of the event (i.e., it would be more like a dual sport) and minimize BLM expenses	Competitive Event Corridors • New, frequent use of the Stoddard to Johnson Valley and Johnson Valley to Parker corridors for competitive events would result in impacts to the Ord-Rodman DWMA when increasing familiarity and popularity of the area result in more casual use • The two competitive event corridors represent a continuing, authorized impact. Significant impacts could be avoided but only if yellow-flag conditions are rigorously implemented.
Dual Sports • Maintaining dual sports as regulated would continue to increase participant awareness of tortoise conservation measures (i.e., non-competitive, restricted to existing route width, 35 mph speed limit, seasonal restrictions, etc.), has resulted in no known loss of tortoises, and would provide for compatible vehicular use, so long as currently regulated • BLM's revision of its educational materials provided to dual sports participants to indicate that both adult, and particularly hatchling, tortoises may be active at Thanksgiving, and that riders should watch for and avoid such animals, would make riders aware that tortoises could be out and should be avoided.	Dual Sports

BENEFITS	RESIDUAL IMPACTS

Other Conservation Measures
• *Signing* programs would clearly identify areas intended for intense OHV recreational use (e.g., BLM open areas) versus those intended for tortoise conservation (e.g., DWMAs), which would allow for better user education and increased law enforcement
• Installation of a *new fence* between the Johnson Valley Open Area and the Ord-Rodman DWMA would minimize recreation impacts that are not otherwise regulated by this alternative (i.e., no changes in management of open areas)
• *Camping* restrictions to existing disturbed areas adjacent to designated open routes would minimize impacts associated with current management (where camp locations may occur in any habitats within 300 feet) and provide for increased law enforcement capabilities
• *Stopping and parking* would be allowed within 50 feet of *designated* routes, which would result in less habitat degradation than at present where stopping and parking are allowed within 300 feet of *existing* routes
• Acreage within the stopping and parking corridor would be reduced within the Fremont-Kramer, Superior-Cronese and Newberry-Rodman DWMAs follows:
  • Fremont-Kramer DWMA: from 52,361 acres to 10,138 acres
  • Superior-Cronese DWMA: from 54,499 acres to 9,833 acres
  • Ord-Rodman DWMA: from 17,512 acres to 3,146 acres
• The *education program* would be especially tailored to minimize OHV recreational impacts in DWMAs, and result in increased awareness of both permitted recreational opportunities and restrictions benefiting tortoise conservation
	Other Conservation Measures
	• Alternative fails to protect still higher density tortoise areas in the western portions of the Johnson Valley Open Area and the northern portions of the Stoddard Valley Open Area. In Stoddard Valley, higher density tortoise areas occur that are not apparently affected by older or newer die-offs. The alternative lacks an increased education program, seasonal restrictions on certain events, and requirement for re-routing competitive corridors away from higher density areas, which would have minimized impacts, especially in the northern portion of the Stoddard Valley Open Area.

Gunshot Impacts • Increased law enforcement would result in less violation of current statutes regulating hunting and target shooting practices	Gunshot Impacts • Current management would remain unchanged with regards to hunting and target shooting in DWMAs. However, gunshots continue to be one of the primary causes of identifiable tortoise mortality. Beyond current management, the alternative fails to provide any new means to deal with gunshot mortality. Although effective education and law enforcement would help, failure of law enforcement to address this impact would constitute a significant impact.

Transportation: In this section, impacts associated with construction and maintenance of federal and State highways are discussed. The California Department of Transportation has identified all federal and State highway projects that would be authorized and likely developed during the 30-year term of the plan. Mitigation and minimization measures include the payment of compensation fees, performance of tortoise clearance surveys, implementation of applicable BMPs, fencing of highways, and coordination of projects with counties and BLM. Benefits and residual impacts associated with these measures are compared in Table 4-31.

Table 4-31
Benefits and Residual Impacts of Transportation

BENEFITS	RESIDUAL IMPACTS
• Highway fencing would result in fewer tortoises being crushed, reduced impacts of passing motorists on adjacent habitats (i.e., dumping, exercising pets, etc.), reduced likelihood for collecting or poaching tortoises, fewer crushed animals available to common ravens. • The distribution of recent die-off areas south of Highway 58 suggests that this fencing may have the positive effect of curtailing the spread of disease. • Insofar as possible, highway fencing would be installed (particularly along Highway 395 adjacent to DWMAs) sooner than later, and before construction	• Fencing would result in habitat fragmentation. • If there is less carrion available for ravens, there is the potential that, rather than leave the area, ravens may switch to other available forage, including tortoises and other wildlife. • If fencing does not occur until road construction (e.g., 2013 to 2015 for Highway 395 widening between Adelanto and Red Mountain), tortoises would continue to be crushed in the interim. This could result in the loss of about two tortoises per linear mile, and may selectively impact subadults that are sufficiently large to be less vulnerable to raven predation
• Culverts would be installed, which lessens the impacts of habitat fragmentation	• Once culverts are installed, they would allow passage of disease-infected tortoises into adjacent populations that may be relatively disease-free, which is suggested by recent die-off areas south of Highway 58
• Previous Caltrans proposals would be modified under this alternative to occur as near as possible to existing federal and State highways, otherwise they would compensate for all habitat occurring between the existing and new alignments; this would result in less fragmented habitats within DWMAs	• Serious habitat fragmentation would occur in the Fremont-Kramer DWMA if Helendale Road (between Silver Lakes and Highway 58) were paved and used as a primary transportation route; alternative fails to require fencing of this road if paved • Alternative fails to regulate new road construction by county road departments, which could result in habitat fragmentation in unknown patterns

Establishing DWMAs and maintaining them in an unfragmented condition is essential to the success of the strategy. Highway fencing would result in intended benefits (e.g., reduced road kill, less raven food), but may also have residual impacts (e.g., habitat fragmentation, ravens redirected from carrion to wildlife in adjacent areas). Timing is also critical. If fences can be erected sooner than construction, the program would result in significant beneficial impacts. Recent die-offs south of Highway 58 suggest that culverts may allow disease to spread into uninfected populations. Culverts would necessarily be required to allow for flows of rainwater runoff, however it may be better if such culverts were constructed to allow for runoff but be blocked so that tortoises could not cross beneath the roadways.

Utilities: Alternative A would result in clarifying CDCA guidelines and providing new guidance for alternative use of designated corridors. Benefits and residual impacts are tabulated below in Table 4-32.

Table 4-32
Benefits and Residual Impacts of Utilities

BENEFITS	RESIDUAL IMPACTS
Utility Participation • Utilities would ensure that protective measures, particularly for ravens, would be implemented along transmission lines occurring within DWMAs • Issuance of USFWS salvage permits to utilities would facilitate removal of offending ravens, provide feedback to the Implementation Team where problem areas have been identified, and generally promote implementation of the raven management plan	
• Program would ensure that maintenance workers of signatory utilities are aware of tortoises and avoid them, and adhere to seasonal restrictions and alternatives identified.	• None, as neither take nor new loss of habitat would be authorized
• Alternative would require that all right-of-ways in DWMAs are to be revegetated	• Alternative fails to indicate success criteria, implementation schedules, remedial actions, and other standards that would ensure acceptable revegetation
• Alternative would clarify that new utility construction in BLM-designated corridors must minimize impacts, and alternative corridors used as recommended, which would be governed by the Implementation Team	• Alternative would allow for serious habitat fragmentation by linear developments, particularly wind power facilities, that otherwise fit within the context of the 1% AGD; wind power facilities are not restricted to utility corridors identified in the CDCA Plan

Most of these measures provide for clarification and implementation of protective measures currently available but not being pursued. Issuance of a salvage permit that would allow for removal of ravens where tortoise predation is documented would ostensibly result in fewer ravens in the region. However, displaced ravens could switch to Joshua trees or other natural and manmade substrates even if all nests are removed from transmission towers, so such measures are more likely to "contribute to" than "result in" raven control.

Weed Control: Alternative A provides for better communication between the Implementation Team and local weed abatement groups, as indicated below in Table 4-33.

Table 4-33
Benefits and Residual Impacts of Weed Control

BENEFITS	RESIDUAL IMPACTS
• Would provide for potential funding and coordination between the Implementation Team and local weed management agencies • Programs that result in less ground disturbance (i.e., fire fighting, grazing, reduced availability of routes, etc.) would substantially contribute to minimizing spread of exotic species	• Alternative fails to, nor is there any clear means how to, eradicate non-native species that have already become well established

Increased communication and cooperation between administrators of the plan and local agencies is not the same as a program with explicit management prescriptions. Developing the latter is complicated at present by the lack of any clear means to control established exotic species, such as red brome (*Bromus madtradensis*), cheat grass (*B. tectorum*), and split-grass (*Schismus* sp.), or even incipient ones, like Moroccan mustard (*Brassica tournefortii*). A solution may require additional steps by the Implementation Team and weed abatement groups to identify specific mechanisms or to collaboratively develop specific plans.

Overall Efficacy of Alternative A: As described in text following each of the above tables, there are both strengths and weaknesses associated with this alternative. Strengths include (a) establishing a conservation land base in the form of DWMAs; (b) ACEC management in the DWMAs, particularly where new prescriptions avoid impacts associated with no change in multiple use classes; (c) retention of all public lands within DWMAs; (d) 1% Allowable Ground Disturbance; (e) more protective measures for filming on private lands; and (f) enhanced take avoidance during new construction. Importantly, Alternative A could function without the requirement to acquire all private lands, as is envisioned for Alternative C (Recovery Plan alternative). Elimination of sheep grazing from 14 mi^2 of the Shadow Mountain Allotment would effectively remove this impact from the conservation area. This would benefit tortoise conservation without significantly curtailing sheep grazing outside the DWMAs, on both private and public lands, and therefore not significantly affect that industry. Each of these and several other programs augment current management in a proactive manner, which would be a significant beneficial impact with regards to tortoise conservation and recovery.

Analysis of available data indicate that there are a total of 4,225 linear miles of existing routes (including single track routes) on public lands within the four DWMAs, and that 1,855 linear miles, comprising 44% of digitized routes, would be closed under Alternative A. (Note that this discussion applies to all alternatives except Alternative G, where route reductions associated with ACEC plans and the 1985 and 1987 route designations would be implemented.) Reductions would include 577 linear miles in higher density tortoise areas, representing a 50% reduction in this area. There would also be a 42% reduction in lower density areas within DWMAs, with the closure of 1,278 linear miles in such areas. Digitized routes in washes would also be reduced by 66%, leaving only 60 of the 177 linear miles digitized available for future use. Cumulatively, these closures, if implemented in a timely manner, would constitute a significant beneficial impact to tortoise conservation in the planning area.

Persisting noise is associated with vehicle use on highways and freeways, vehicle use on some dirt roads, over-flights of airplanes, military maneuvers, operation of heavy construction equipment including mines, blasting associated with construction and mining. With the exception of vehicle use on dirt roads, most of these noises are associated with specific regions, such as along paved roads, on military installations, and at new construction sites or mine sites. The main noise source that would differ among the alternatives is noise related to OHV use. The intensity and distribution may vary, depending on the given alternative, as described below.

All alternatives share the same proposed route designation and implementation characteristics. It is not clear how long it would take route closures to be implemented, or know how well compliance will function. However, since these unknown variables affect all alternatives, they do not detract from the following observations. The proposed reduction of 44% (i.e., 1,855 of 4,225 linear miles) of the known existing routes in Alternative A's DWMAs would serve to remove OHV noise from a substantial part of the important tortoise habitat under all alternatives.

Alternatives A, B, C, and D are similar enough that OHV noise levels, increased law enforcement, and several other measures would be similarly affected. Each has a one-percent allowable ground disturbance threshold, which would minimize the distribution of new development and associated noises. Alternatives E, F, and G lack this threshold and protection. Alternative E allows for both widespread noise and concentrated noise (in the new recreation area and expanded El Mirage Area). Of all the alternatives, Alternative E is the one most likely to result in widespread noise associated with OHV activity. Alternative F would result in similar ubiquitous use, but may not have the new focal areas likely to develop under Alternative E.

There are also some weaknesses associated with Alternative A: (a) retention of current multiple use classes would affect conservation management, including some of the higher density tortoise areas found inside the DWMAs; (b) new agriculture would still be allowed inside DWMAs on all private lands and on Class M and unclassified public lands; and (c) the alternative does not avoid all impacts of cattle grazing. It would apply the "Exclusion Area" concept and ephemeral forage thresholds, neither of which is likely to minimize impacts to important habitats nor avoid competition over limited forage between cattle and tortoises, respectively. Importantly, Alternative A would not provide for effective disease management, which would be far more efficacious if applied (or modified) as described below in Alternative F.

4.2.2.3 Mohave Ground Squirrel

Alternative A proposes a conservation strategy that would provide for MGS conservation within a Mojave Ground Squirrel Conservation Area (MGS CA) and the two DWMAs (Fremont-Kramer and Superior-Cronese DWMAs) that would be established under Alternative A for the desert tortoise. Table 4-34 reports only those benefits and residual impacts as they relate to MGS conservation that are different from the impacts identified under Alternative A for the tortoise.

Similar benefits and residual impacts given for the tortoise would affect the following programs where the two species ranges coincide: Compensation and Fee Structure; 1 % Allowable Ground Disturbance; Category I, II, & III and Critical Habitats for Tortoises; Dump Removal and Waste Management; Feral Dog Management Plan; Fire Management; Habitat Credit Component; Habitat Reclamation and Restoration; Land Acquisition; Law Enforcement; Livestock Grazing; Mining; Raven Management Plan; Signing and Fencing DWMAs; Motorized Vehicle Access; Stopping, Parking, and Camping; and Highway Fencing and Culverts.

Table 4-34
Mohave Ground Squirrel Impacts of Alternative A

BENEFITS	RESIDUAL IMPACTS
Conservation Area Size of Conservation and Incidental Take Areas • (HCA-2) The conservation area established for the MGS would be 2,693 mi^2, or 35% of the 7,691 mi^2 range. • (HCA-2) Those portions within the MGS range that are outside military bases and the MGS CA occupy (2,243 mi^2), or 29% of the range, which corresponds to the incidental take area. • (HCA-2) As such, the conservation area would be 450 mi^2 larger than the incidental take area. The intended conservation strategy, if implemented as envisioned, would be sufficient to fully minimize and mitigate authorized take of the MGS and occupied habitats.	Conservation Area Size of Conservation and Incidental Take Areas • (HCA-2) MGS CA does not include 4,998 mi^2 (65%) within the range, including 2,243 mi^2 outside military installations (i.e., 2,755 mi^2 are on military installations and therefore cannot be counted as conserved under the plan)
Specified Conservation Areas Outside the MGS CA Los Angeles County Significant Ecological Area • The formal adoption of the Los Angeles County Significant Ecological Area, and participation by Los Angeles County, would provide for heightened review by the Significant Ecological Area Technical Advisory Committee (SEA TAC), which would require SEA TAC to consider future projects in the context of overall MGS conservation in the southern portion of its range, outside the MGS CA. Although this is desirable, if the prescription is not adopted in the final EIR/S, SEA TAC would continue to function in a similar protective manner.	Specified Conservation Areas Outside the MGS CA Los Angeles County Significant Ecological Area
Specified Conservation Areas Outside the MGS CA Sierra Foothills Habitat Connector • Establishing the Sierra Foothills Habitat Connector would require Kern and Inyo counties to ensure that development does not completely sever the corridor, which is important to ensure connectivity between MGS populations occurring within and adjacent (i.e., north and south of) that connector.	Specified Conservation Areas Outside the MGS CA Sierra Foothills Habitat Connector

BENEFITS	RESIDUAL IMPACTS
Specified Conservation Areas Outside the MGS CA Species-specific Conservation Areas • MGS conservation would benefit from the establishment of the following new conservation areas for other species (acreage given in parenthesis are within the MGS range): Alkali Mariposa Lily (59 mi^2), Barstow Woolly Sunflower (57 mi^2), Bendire's Thrasher (27 mi^2), Big Rock Creek (7 mi^2), Lane Mountain Milkvetch (27 mi^2), and North Edwards (22 mi^2).	Specified Conservation Areas Outside the MGS CA Species-specific Conservation Areas
Management Structure within the MGS CA DWMA Management within the MGS CA • (HCA-2) The 1,736 mi^2 included in the Fremont-Kramer and Superior-Cronese DWMAs would be managed for the tortoise, 1,449 mi^2 (19% of the range) of which would benefit MGS conservation. • (MGS-2) Applying measures identified for the two DWMAs, Tortoise Survey Areas, and No Survey Areas to the MGS CA where they overlap, would have similar beneficial impacts as described above under Alternative A for the tortoise. Incidental Take Authorization • Take would be permitted under issuance of a programmatic Section 2081 permit by the CDFG. Major benefits would be realized, and serious flaws with current management would be rectified, that would provide for regional MGS conservation that is currently lacking.	Management Structure within the MGS CA DWMA Management within the MGS CA Incidental Take Authorization
Management Structure within the MGS CA Best Management Practices • BMPs described for the tortoise would also benefit MGS where the ranges overlap, and effectively serve to minimize additional habitat loss from adjacent areas	Management Structure within the MGS CA Best Management Practices • Unlike the tortoise where animals may be rescued from harm's way, both the MGS and occupied habitats would be lost in places where the MGS occurs, and BMPs would fail to avoid this impact. • As with tortoise, BMPs would fail to alleviate indirect impacts to habitat and squirrels adjacent to authorized projects.
Management Structure within the MGS CA HMP Instead of ACEC Designation	Management Structure within the MGS CA HMP Instead of ACEC Designation • Designating the MGS HCA as a Habitat Management Area would provide for less protection and funding priority than if the conservation area were designated as an ACEC.
Management Structure within the MGS CA Multiple Use Class Designations • Those portions of public lands within the MGS CA that are immediately south of Owens Lake, would be reclassified from class M to class L, and constitute a marginal beneficial impact under CDCA Plan guidelines.	Management Structure within the MGS CA Multiple Use Class Designations • Impacts identified relative to guidelines for development in class M and unclassified public lands would also affect the MGS

BENEFITS	RESIDUAL IMPACTS
Conservation Relative to Military Bases • (HCA-2) MGS conservation would remain unchanged on military bases, which at Edwards AFB and China Lake would benefit overall MGS conservation. • (MGS-6) Establishing a Military Coordination Group would ensure communication and cooperation among all management entities (i.e., BLM and county jurisdictions), and have the best potential for ensuring MGS conservation throughout the known range. Establishing annual coordination meetings between the Implementation Team and the MGS Technical Advisory Committee would have similar benefits.	Conservation Relative to Military Bases • (HCA-2) Those portions of the MGS range within Fort Irwin NTC (571 mi^2, or 7.5% of the range), and the Fort Irwin expansion area (110 mi^2, 1.5% of the range), would be affected by maneuvers below 20% slope; 681 mi^2 (9%) of the range would be affected by existing and future maneuvers at Fort Irwin; new use may result in the expansion of the round-tailed ground squirrel into the MGS range.
Miscellaneous Conservation Programs Commercial Filming and Plant Harvest • (MGS-1) Applying protective measures for commercial activities (i.e., commercial filming and plant harvest) identified for the tortoise to MGS conservation would have similar beneficial impacts described above under Alternative A for the tortoise.	Miscellaneous Conservation Programs Commercial Filming and Plant Harvest
Miscellaneous Conservation Programs Education	Miscellaneous Conservation Programs Education • The education program identified for the tortoise would fail to protect the MGS, which is a relatively unknown species that would require additional measures for conservation to be understood by affected publics
Miscellaneous Conservation Programs Utilities Construction and Maintenance • (MGS-1) Applying protective measures for utility construction and maintenance identified for the tortoise to MGS conservation would have similar beneficial impacts described above under Alternative A for the tortoise.	Miscellaneous Conservation Programs Utilities Construction and Maintenance
Recreation Competitive Events • (HCA-40) Prohibition of vehicle speed events within the MGS Conservation Area would serve to minimize the amount of habitat degradation that is typically associated with this type of activity. This is likely to be more of a benefit to MGS habitat (important) than to actual squirrels, which are less likely to be crushed than tortoises, for example.	Recreation Competitive Events
Recreation Non-competitive Events (Dual Sports) • Allowing dual sports events in those portions of the MGS Conservation Area outside of the DWMA between September and February would have marginal benefits, as this activity is not likely to significantly affect the MGS or its conservation. • Allowing dual sport events year round outside DWMAs and the MGS Conservation Area would have similar, minimal benefits given in the preceding bullet.	Recreation Non-competitive Events (Dual Sports)

BENEFITS	RESIDUAL IMPACTS
Recreation Hunting and Shooting • (MGS-1) Applying protective measures for hunting and shooting identified for the tortoise to MGS conservation would have minimal benefits to the MGS, as intentional shooting has not been identified as a problem for the species, nor are the cryptic and secretive MGS likely to be susceptible to this form of impact.	Recreation Hunting and Shooting
Surveys Presence-Absence Surveys • (MGS-3) Eliminating CDFG's requirements to trap for the MGS or assume presence and mitigate accordingly would not appreciably affect MGS conservation, as most of the projects occur in the southern portion of the range where the MGS may already be mostly extirpated. This would also be a major significant beneficial impact to the development community, in terms of reduced mitigation fees, without seriously compromising MGS conservation.	Surveys Presence-Absence Surveys
Surveys Exploratory Surveys • (MGS-5) Conducting trapping studies in the northern portion of the Antelope Valley in Kern County, on the 23 sections of public land identified in Chapter 3, would ascertain if the species occurs. If it does, this would constitute a significant new finding that may enhance the overall MGS conservation strategy, as at present, the species is considered to be absent from areas west of Highway 14.	Surveys Presence-Absence Surveys
Transportation Road Maintenance	Transportation Road Maintenance • (AB-7) Highway maintenance seasonal restrictions, roadbed and berm requirements, and preclusion of the use of invasive weeds for landscaping would apply, which could result in impacts to the MGS, which is known to burrow in roadside berms. There are no available data to determine if this may constitute a significant impact, but it is likely to constitute an impact where MGS burrows would be destroyed.
Monitoring • (MGS-4) Establishing a monitoring strategy, designed and put in place by the Implementing Team, in coordination with the MGS Technical Advisory Committee, to ensure that the management program for this species is accomplishing its objectives would constitute a significant beneficial impact.	Monitoring

The MGS CA would encompass 2,693 mi^2, which is about 35% of the 7,691 mi^2 known range. About 2,241 mi^2 (29%) of the known range would be available for incidental take. (The remaining 2,757 mi^2 (36%) of the range occurs on Edwards AFB, China Lake NAWS, and Fort

Irwin NTC, to which the West Mojave Plan's conservation strategy would not apply.) As such, the MGS CA would encompass about 55% of the MGS range occurring outside military installations. Similar factors would affect the inclusion of 87 MGS records (34% of 252 known records) within the MGS CA.

All alternatives, including Alternative A, would encompass the six plant communities in which 86% of the MGS records were reported (i.e., creosote bush, Mojave mixed woody scrub, saltbush scrub, shadscale scrub, blackbush scrub, and hopsage scrub). Analysis revealed that about 96% of the MGS CA would be comprised of these six plant communities. Diversity of plant communities is similar for all alternatives, and for Alternative A would include 27 different communities, including the 12 native plant communities known to be used by the MGS.

The MGS CA would include 1,442 mi^2 of Class L lands, or about 72% of the 2,016 mi^2 public lands within the MGS CA that would be managed by the BLM. There would also be 422 mi^2 of class M and 50 mi^2 of unclassified public lands within the MGS CA that would provide for relatively less protection than provided for under Class L guidelines. Excepting Alternative B, where there would be 380 mi^2 of wilderness areas, all alternatives would include 396 mi^2 of wilderness, where authorized land use activities would be compatible with MGS conservation (excepting where sheep grazing occurs; there are also illegal OHV vehicle uses).

Impacts associated with the hybridization zone, agriculture, urban development, above-average vehicle use, and transportation corridors are basically the same for all alternatives (minor differences are discussed under Alternative B). The single largest impact (affecting 333 mi^2 within six of the seven alternatives) is associated with above-average vehicle impacts.

4.2.2.4 Bats

The primary need for conservation of bats is protection of maternity and hibernation roosts, and secondarily, protection of transitory roosts used during migration. These roosts include mine shafts and adits possessing specific conditions of temperature, humidity, and light, especially for Townsend's big-eared bat and the California leaf-nosed bats. They must be free from human disturbance. Roosts are also found in rock crevices, abandoned buildings, under highway bridges, and in water tunnels.

Alternative A protects all known significant roosts by restricting human access with placement of gates than can be traversed by bats. This measure fulfills Objective 1. The bat roost under the Interstate 15 crossing of the Mojave River would have separate mitigation provided by Caltrans.

Access is maintained in the Pinto subregion to one location with an important roost. Other routes of travel allow vehicles to come within one-half mile of a known roost. Until the adit entrances are gated, these roosts are somewhat at risk of human disturbance. The routes provide access to existing mining claims at the sites or in the immediate vicinity. Several desert washes in the area used for foraging by California leaf-nosed bats are undisturbed by vehicles.

Because bats are so poorly known, the alternative provides for survey procedures at potential roost sites. If significant roosts were found, either on public or private lands, protection would be provided via installation of protective gates or other measures, as appropriate. This requirement is a substantial beneficial change from existing procedures, which tend to ignore the potential for bat use of an area. This fulfills Objective 3.

The level of take of the target bat species is minimized by the limitation to sites where less than 25 bats are present and, for the two most vulnerable species (Townsend's big-eared bat and California leaf-nosed bat) to sites where less than ten individuals are present. Foraging habitat for these two species would be protected and routes of travel would be eliminated from riparian areas and desert washes near significant roosts. Evaluation of potential vehicle impacts on the foraging habitat would be done on a case-by-case basis. These measures fulfill Objective 3. This level of take would not substantially affect the bat numbers or distribution in the West Mojave. The small allowed incidental take is fully mitigated by gating of roosts, which would improve the stability of the larger colonies.

The survey requirements and adaptive management program would insure that excessive take would not deplete newly detected roosts, and may lead to additional conservation and management. Monitoring of significant roosts on a periodic basis would allow an evaluation of the effectiveness of the bat gates and other mitigation measures, such as provision of bat houses under bridges.

The biological goal of maintenance and enhancement of all bat populations in the planning area is met by the protection of roosts, protection of foraging habitat for the two rarest species and by the establishment of survey protocols. Continuing monitoring and adaptive management as specified provides a way to evaluate progress towards this goal over the term of the Plan.

The FESA standard of "...mitigate to the maximum extent practicable" is met because few other conservation measures are available for species so poorly known and because the survey procedures allow for identification and conservation of new roost sites. For Townsend's big-eared bat and California leaf-nosed bat, protection of adjacent foraging areas in riparian and wash habitat addresses this life-history requirement. The other species do not have known specific conservation needs beyond roost protection. Most forage over montane sites, agricultural areas, or protected riparian sites, such as Camp Cady (Brown-Berry, 1998, bat species accounts).

4.2.2.5 Other Mammals

4.2.2.5.1 Bighorn Sheep

Bighorn sheep in the West Mojave are found in only a few discrete mountain ranges away from the military bases. Bighorn herds that might be re-established in the Argus Mountains

would benefit from the reduction of the burro populations over time, and from the programs to enhance springs and seeps. In the San Bernardino Mountains, establishment of an ACEC for the carbonate endemic plants would maintain lower elevation habitat for the existing herd. Route designation in the Ord, Newberry, and Rodman Mountains areas would reduce the occasional disturbance from vehicle traffic. Bighorn traveling between the Pinto Mountains in Joshua Tree National Park and the Bullion Mountains in the Twentynine Palms Marine Corps base would benefit from the establishment of a DWMA and from the Mojave fringe-toed lizard Conservation Area because the movement corridor and habitat linkage extending from the Pinto Mountains to the Sheephole Mountains just east of the Plan area would receive greater protection from disturbance of all kinds.

Enhancement of a dispersal corridor and habitat linkage between the San Bernardino Mountains and Little San Bernardino Mountains would benefit bighorn. Alternative A proposes to provide enhancement by adaptive management, since solutions to crossing of Highway 62 at the Morongo grade are not evident, and because travel between the mountain ranges is not well documented. Provisions requiring Dry Morongo Creek to be left unaltered by flood control would keep this wash west of Morongo Valley intact if the sheep utilize this as a travel route.

No direct take of bighorn is authorized or anticipated and bighorn sheep is not a covered species receiving incidental take permits. Minimization and mitigation consists of conserving and reducing human disturbance in the mountainous habitat and protecting water sources.

Alternative A would maintain the proven Pinto-Sheephole-Bullion Mountains bighorn corridor and would allow for improvements to the dispersal corridor between the Little San Bernardino Mountains and San Bernardino Mountains via adaptive management and conservation of Dry Morongo Creek. It would increase the effectiveness of the Joshua Tree National Park – San Bernardino Mountains linkage by acquisition of private lands over time. This would meet the objective of establishment of two public land dispersal corridors.

The potential dispersal corridor between the San Bernardino Mountains and Fifteenmile Point in the Granite Mountains near Lucerne Valley would not be conserved unless additional data proving bighorn dispersal is gathered. Other potential corridors, such as the linkage across Highway 178 between the Argus Mountains and the Slate Range or open space connections between the Ord, Rodman and Newberry Mountains, would be protected by adaptive management if shown to be utilized by bighorn.

Alternative A would also prevent construction of additional barriers in known dispersal areas.

Sheep grazing allotments would be managed to prevent contact of domestic sheep with bighorn. A separation of nine miles between occupied bighorn habitat and areas used for sheep grazing on public lands would be maintained. This measure would effectively prevent transmission of disease from domestic sheep to bighorn.

Recovery and expansion of bighorn, both in numbers and range, is also dependent on protection of lambing sites and, in certain areas, re-introduction of sheep. Provisions to withdraw lambing areas from mineral entry, if necessary and to facilitate re-introduction where appropriate, address this recovery need.

4.2.2.5.2 Mojave River Vole

Minimal take is anticipated by Alternative A, and existing laws regulating disturbance in wetlands and riparian habitat serve to maintain the known vole habitat in the Mojave River. All authorized take of individuals and habitat is associated with projects impacting the habitat in the short term, including trail construction and removal of invasive species. Maintenance for flood control in sections of the Mojave River proceeds on a five-year cycle that allows regrowth of the cleared habitat.

The Mojave River vole would benefit from maintenance of groundwater levels in the Mojave River that support its riparian and wetland habitat. Protection of the Mojave River vole is habitat-based, and depletion of groundwater is almost the only threat to this species. If the Plan adheres to the groundwater criteria for the Mojave River, it would mitigate and minimize take to the maximum extent practicable and meet the state fully mitigate standard.

If the water overdraft in the Mojave Basin is not slowed, stopped, or reversed by measures in the adjudication, the worst-case scenario of drying of the riverbed could occur in Alternative A or, in fact, under any alternative. The local governments do not control the flow of water to and from the basin, but can reduce water loss in the river via removal of water-using invasive plants.

The biological goal of providing long-term conservation of all remaining Mojave vole habitat would be met assuming that groundwater levels are sufficient. The Plan allows projects that alter the habitat in the short-term but provide for recovery of vole numbers and habitat within a few years. Specific measures to remove voles from the path of construction would be implemented. The limited incidental take from flood control activities, exotic species removal, and trail construction would be mitigated by the long-term conservation provided to the habitat from groundwater maintenance.

4.2.2.5.3 Yellow-eared Pocket Mouse

The status of the yellow-eared pocket mouse would remain relatively unchanged by provisions of Alternative A. Threats to this species are few, though its precise range and habitat requirements are poorly known. The monitoring program (M-93) would ultimately better define occupied habitat on public land, which would assist in determining the need for acquisition.

Incidental take is limited to 100 acres. The range totals 164,641 acres, of which 29,032 acres are private land and 133,889 are public land. The Forest Service manages an additional 1,720 acres. Wilderness occupied 62,497 acres, and the ACECs occupy 113,380 acres.

Acquisition of private lands within the Kelso Valley would benefit the species if lands can be consolidated into larger blocks of habitat with similar management. Because most of the known range is on public land, acquisition is only expected to benefit the species at key locations, where the public-private land boundary has incompatible uses or spillover effects.

Monitoring of grazing impacts, using regional rangeland health standards as a benchmark (M-94), would assist in maintaining habitat for this species. Prevention of overgrazing would maintain the food source and cover sites for the yellow-eared pocket mouse.

Alternative A achieves the goal of maintenance and enhancement of existing habitat through provisions related to grazing on public lands. As additional information is obtained on locations and definition of occupied habitat, management and/or acquisition can be directed towards potential future threats. Minimization and mitigation to the maximum extent practicable is achieved, given that little is known beyond specific locality data for the species.

The public and private sector share responsibility for conservation of the yellow-eared pocket mouse. BLM management of the Owens Peak Wilderness, Sand Canyon and Short Canyon ACECs and of grazing allotments within the range of the yellow-eared pocket mouse fully mitigates the proposed take of 100 acres. Additional conservation in the Kelso Creek Monkeyflower Conservation Area, primarily grazing management and potential changes to route designation, should benefit the yellow-eared pocket mouse. The 1% allowable ground disturbance and 5:1 compensation ratio applies to these areas as well. If acquisition becomes necessary, Kern County would assist with identification of suitable parcels.

4.2.2.6 Birds

4.2.2.6.1 Bendire's Thrasher

Three areas of public land management would benefit Bendire's thrasher. In the Coolgardie Mesa area, reducing routes of travel through the Joshua tree habitat would decrease disturbance to this vehicle-sensitive bird during the spring nesting season. Withdrawal of lands from mineral entry for the Lane Mountain milkvetch would benefit the Bendire's thrasher where the two species overlap because it removes the potential threat of ground disturbance, noise and habitat fragmentation. Little change would be evident in the Kelso Valley and Jawbone-Butterbredt ACEC, where existing management appears to support a small population. In north Lucerne Valley, retention of BLM lands and management as open space with defined routes of travel would benefit the species in the long term by preventing urban encroachment.

Bendire's thrasher is not a species for which incidental take authorization is requested. Public lands would be managed to conserve known occupied habitat until additional information is gained on population size and locations. The species may be included in the HCP at a later date, and the analysis below provides a current overview.

Long term loss of potential habitat is expected in the Yucca Valley and Apple Valley areas. Surveys in 2001 (BLM, 2001) concluded that Bendire's thrashers were now absent from these areas where they were present in 1985 and 1986. Future surveys are necessary to determine if the absence of birds in 2001 is a permanent or short-term phenomenon. The acreage conserved in JTNP, north Lucerne Valley, Coolgardie Mesa, and the Kelso Valley (132,497 acres) exceeds the acreage of predicted habitat loss (3,973 acres). If the lands within the National Park are not counted, conservation totals 25,878 acres.

4.2.2.6.2 Brown-crested Flycatcher

This riparian neotropical migrant is now well-protected at Big Morongo Canyon ACEC, Mojave Narrows Regional Park, and potentially at Cushenbury Springs and Indian Wells Canyon. Maintenance of groundwater levels in the Mojave River is the primary provision of Alternative A that would offer additional conservation for the brown-crested flycatcher. Maintenance of the riparian habitat between Victorville and Helendale would allow continued nesting by this species along the river corridor.

Because the depletion of groundwater in the Mojave River is the only identified threat to the brown-crested flycatcher, Alternative A would minimize and mitigate to the maximum extent practicable, as long as the criteria are met. Take of the existing occupied habitat would be negligible, limited to short term effects of flood control maintenance on young riparian vegetation, exotic species eradication projects, and small construction projects, including recreational trails. This take is fully mitigated by the beneficial effects of exotic species removal and achievement of the groundwater standards. The goal of conservation of all suitable riparian nesting habitat is met for the long term, though small projects including trail construction and exotic species removal may impact habitat in the short term.

4.2.2.6.3 Burrowing Owl

Until a baseline is established for habitat conserved, jurisdictions would employ existing procedures for burrowing owl protection. These measures are probably not completely effective in preventing take of owls in urbanizing areas, but do prevent mortality by requiring eviction or relocation where owls are detected on development sites. The distribution of educational brochures to project applicants within city limits (Rap-9) is expected to increase detection and therefore decrease incidental take. Performance of abbreviated surveys for owls where tortoise clearance surveys are required would also decrease incidental take.

Alternative A would improve the habitat for this raptor by reducing vehicle disturbance at nest locations in more remote desert habitats. Reductions in route density, compared to the 2001 inventory, in the Coyote, El Mirage, Fremont, Kramer, Newberry Rodman, Ord, Red Mountain and Superior subregions are significant. Elimination of travel on single-track trails and dirt roads in these areas will create larger blocks of disturbance-free habitat for the burrowing owl.

Achieving minimization and mitigation to the "maximum extent practicable" relies on the definition of "practicable". The local jurisdictions consider an owl survey of every parcel seeking a discretionary permit to be impracticable, and have indicated that an education program would achieve the same result. Considering the high interest in protection of this species by the public and by the wildlife agencies, it is likely that the education program would be effective within a relatively short time frame. Increased reporting of burrowing owl sightings and nest sites would provide the cities and urbanizing county areas with a database that can be used to inform development applicants of the potential for owls to be present on their property.

The burrowing owl conservation strategy does not address the potential threat of poisoning by pesticides or rodenticides because ongoing agricultural operations are not regulated by the Plan. Rodent control outside agricultural areas is minimal and normally employs mammal-specific compounds that do not secondarily poison burrowing owls. The threat to owls from agricultural operations is unknown, but believed to be minimal. It is likely that several pairs of resident burrowing owls exist compatibly near existing agricultural fields, which provide an enhanced food source. Others are known to be present within industrial sites without evident threats, as along the railroad yards near Barstow.

The limitation on incidental take and requirement for matching acquisition of conservation acreage with acreage of habitat lost (Rap-13) allows the conservation strategy for burrowing owl to meet the biological goals. As research (Rap-12) and acquisition proceeds over time, conservation of burrowing owls would become increasingly assured.

4.2.2.6.4 Ferruginous Hawk

Alternative A requires installation of raptor-safe electrical distribution lines. This measure would protect the ferruginous hawk from electrocution hazards from new facilities. The extent of the potential hazard to ferruginous hawks and other large-wingspan birds is not known, but may be substantial, and it is believed to be the primary threat to the hawk in the western Mojave Desert. The monitoring of existing distribution lines and identification of "problem poles" in areas where these hawks winter could be an important achievement. Retrofitting of "problem poles" with perch guards or insulating devices on the conductors would be a major benefit.

Loss of foraging habitat is not a substantial threat. About 8% of the unincorporated Antelope Valley might be urbanized in the next 30 years, a loss of 40,000 acres of open space and agricultural lands to urban development out of a total of about 510,000. A total of 470,000 acres will remain, which represents a significant foraging area for ferruginous hawks.

The conservation program would minimize and mitigate to the maximum extent practicable because it addresses the primary specific threat to the ferruginous hawk. Take of wintering habitat is not limiting, and take of individuals by electrocution is unknown. However, the program for raptor-safe electrical distribution lines is believed to fully mitigate the incidental take because it would, over time, remove the problem causing unanticipated mortality.

4.2.2.6.5 Golden Eagle

The golden eagle will not be a covered species, but the BLM will implement measures on federal lands to achieve the goals and objectives.

Most golden eagle nests are within designated wilderness, and nest disturbance is not a major factor. For those nests that are accessible, the provisions of Alternative A regarding mining and the designation of a route network that mostly avoids nest sites would be a beneficial aspect of the plan that minimizes impacts to the maximum extent practicable. The restrictions on blasting operations during mining address disturbance during the nesting period, and the line-of-sight and distance standards for route designation avoid human disturbance to nest sites during sensitive periods.

The requirement for raptor-safe electrical distribution lines would most certainly benefit the golden eagle, even though the extent of an electrocution problem is not well known. Identification of "problem poles" through monitoring, followed by retrofitting with perches, perch guards, or insulating devices is a method of habitat enhancement that directly addresses an important cause of mortality.

The conservation program would minimize and mitigate to the maximum extent practicable because it addresses one of the three main threats to the golden eagle in the West Mojave. The magnitude of threats from shooting and ingestion of lead is unknown, but believed to be infrequent in the West Mojave area. Take of wintering habitat is not an issue, and take of individuals by electrocution is unknown. However, the program for raptor-safe electrical distribution lines is believed to fully mitigate the incidental take because it would, over time, remove the problem causing incidental take.

Establishment of a current baseline number of golden eagle nests would allow direct comparison with the late 1970's database and an assessment of how eagles may have been impacted since that time. It would provide precision to the goal of maintaining 90% of the number of nesting territories and allow evaluation of how well the Plan is meeting this goal.

4.2.2.6.6 Gray Vireo

No mechanisms currently exist for avoiding fragmentation of the desert edge habitat for the gray vireo. Establishment of the Big Rock Creek Conservation Area (HCA-3) and expansion of the Los Angeles County Significant Ecological Area overlay zoning would tend to maintain open space in key habitats in Los Angeles County. In San Bernardino County, known occupied habitat is in an area of large lot zoning and mountainous terrain. Further subdivision and building in this area near the CDCA boundary is constrained by the terrain. Existing and future (B-8) County development review limits alteration of habitat in Oak Hills and Phelan where vireos have been reported.

Without measures to prevent fragmentation of habitat, the corridor of suitable habitat along the foothills of the San Gabriel and San Bernardino Mountains between Palmdale and Joshua Tree National Park would be irrevocably broken. Because the proposed Los Angeles County SEA covers nearly the entire remaining undisturbed habitat, the preferred alternative would mitigate and minimize to the maximum extent practicable. Retention of scattered BLM lands in the foothills of the San Gabriel Mountains (B-9) would contribute to conservation of habitat and be a beneficial change over the current disposal designation under the LTA.

In the San Bernardino Mountain habitat at the desert edge from Cajon Pass to Joshua Tree National Park, much of the land is within designated Wilderness (Bighorn and San Gorgonio units). Establishment of the Carbonate Endemic Plants ACEC and route reduction at the Juniper Flats ACEC and the surrounding Grapevine Recreation Lands would provide additional conservation benefits for the gray vireo in this part of its range.

Monitoring of known nesting areas over time will establish the potential threat of cowbird parasitism on the gray vireo. If the threat is shown to be substantial, a cowbird-trapping program will be initiated as part of the adaptive management provisions of the plan.

The take of potential and possible occupied habitat by rural residential development in Phelan, Juniper Hills and Pinon Hills is fully mitigated by conservation of the only remaining large blocks of occupied habitat along the San Gabriel and San Bernardino Mountains foothills.

4.2.2.6.7 Inyo California Towhee

Incidental take would be allowed on the 2% of the habitat for this bird that is privately owned. These areas, in Homewood Canyon and Crow Canyon north of Trona, are near existing residences. Towhees are known to come to bird feeders at the residences and there are no apparent current threats to the privately owned habitat. The private land is not designated as critical habitat. Future land use changes to the private land sites where towhees are present would not reduce the numbers of birds below a self-sustaining level or appreciably reduce the acreage of available habitat.

Restoration of the designated springs by removal of invasive plants would benefit the Inyo California towhee. Continuation of the program to remove feral burros in the Argus Mountains (B-12) would have a substantial beneficial affect on this bird.

Designation of routes on public lands does not affect this species. The Ridgecrest Field Office has created barriers at accessible springs in the Argus Mountains (North Ruth Spring, Austin Spring, Benko Spring), so that the habitat for the Inyo California towhee is protected from vehicle intrusion. Open routes are not designated for access to Bainter Spring. These springs are designated as critical habitat by USFWS. No aspect of the Alternative A route designations will adversely modify the critical habitat.

Monitoring of Peach Spring would determine if burro exclosure fencing is necessary. Because the towhees nested successfully at this site in 1998 despite the apparent damage to the riparian habitat at the spring, a delay in fence installation is not expected to contribute to a decline in the local numbers of the Inyo California towhee.

In 1998, the census of towhees met the population goals of the Recovery Plan. If continued monitoring on BLM and Navy lands indicates that the population remains high enough over a five-year period, this species could be delisted. The conservation program could achieve the goals of the Recovery Plan over time and result in delisting. However, achieving this goal requires cooperation and commitment to conservation on military lands and removal of feral burros from remote areas, which is extremely difficult. It may be that higher numbers of towhees are only present in years of sufficient rainfall and that the standards of the Recovery Plan are not achievable on a sustainable basis.

4.2.2.6.8 LeConte's Thrasher

Establishment of large, contiguous habitat is the primary need of the LeConte's thrasher, a relatively common bird that is susceptible to habitat fragmentation. The proposed DWMAs, MSG conservation areas and NPS lands would provide sufficient space to maintain a viable unfragmented population over the range of this species within the West Mojave. Route designation would improve the habitat for this vehicle-sensitive bird by reducing motion and noise disturbance at nest locations in its desert wash and creosote bush scrub habitats. Reductions in route density, compared to the 2001 inventory, in the Coyote, El Mirage, Fremont, Kramer, Newberry Rodman, Ord, Red Mountain and Superior subregions are significant. Elimination of travel on single-track trails and dirt roads in these areas will create larger blocks of disturbance-free habitat for the LeConte's thrasher.

Incidental take would occur near urbanizing areas where much of the habitat is already fragmented. The acreage of suitable habitat in the DWMAs exceeds and fully mitigates the acreage of incidental take based on growth projections. The route designation in all parts of the planning area on BLM lands minimizes impacts to the maximum extent practicable by reducing disturbance to nesting birds, and the proposed acquisition within conservation areas provides mitigation sufficient to meet the federal standard.

4.2.2.6.9 Long-eared Owl

Alternative A would protect long-eared owl nesting habitat and a potential communal roost site at Big Rock Creek. Remaining conservation measures are implemented as part of the monitoring and adaptive management programs. Some areas known to be important to the long-eared owl, such as Indian Joe Canyon in the Argus Mountains are already adequately protected. Continued reduction in the burro herds in the Argus Mountains would allow expansion of the suitable habitat in the Argus Mountains.

The standard for nest site avoidance (Rap 2) combined with conservation of Big Rock Creek and Indian Joe Canyon, will achieve the biological goal and will minimize and mitigate adverse impacts to the maximum extent practicable. Take of long-eared owl, limited to habitat and not individuals, would consist of minor construction, such as trail construction at Big Rock Creek, Indian Joe Canyon, Big Morongo Canyon, or Mojave Narrows Regional Park. This take is fully mitigated by the acquisition and management of the known nest and communal roosts.

4.2.2.6.10 Prairie Falcon

Although many of the prairie falcon nest sites are within Wilderness, the remaining sites are often subject to human disturbance during the nesting season. Route designation in mountainous terrain would improve conservation for prairie falcon because heavily used routes in the line-of-sight of an active nest would be closed or re-routed. The standards for mining, including restrictions on blasting, would also allow continued use of nest sites near active mines.

Take of falcons by falconry has declined to nearly zero, and would not be considered "incidental", since it is permitted by the CDFG. No other take of individuals is authorized by the Proposed Action. Incidental take in the form of nest site disturbance is minimized by the mining standards and by route designation, including seasonal limitations on use, as at Robber' Roost. Foraging habitat is not limiting to prairie falcon populations overall in the West Mojave, so land development is not considered incidental take.

Establishment of the Argus Range and Middle Knob Key Raptor Areas would not provide additional conservation, but would place these sites on BLM's national database of locations important to birds of prey.

At least one falcon nest has been identified with an Open Area (WRI, 2002). Although this pair appears to have adapted to the vehicle disturbance, this site may not persist in the long term and would be considered as an incidental take area.

Implementation of Alternative A would achieve the biological goal of maintaining the population numbers within the West Mojave.

4.2.2.6.11 Southwestern Willow Flycatcher

This riparian neotropical migrant is very rare in the West Mojave Plan area, known recently as a resident from only Mojave Narrows Regional Park, and historically at Big Morongo Canyon ACEC. Maintenance of groundwater levels in the Mojave River is the primary provision of the West Mojave Plan that would offer additional conservation for the southwestern willow flycatcher. Maintenance of the riparian habitat between Victorville and Helendale would allow continued nesting of this species along the river corridor and provide areas for the population to expand and recover.

In the event that the groundwater standard is not met, incidental take permits would be revoked or suspended for this and other riparian-dependent species found in the Mojave River. The affect of lowered groundwater on the southwestern willow flycatcher would most likely involve a long-term decline and contraction of the local range to the Mojave Narrows, where permanent groundwater is present. The overall impact may not be too different from the existing conditions, since willow flycatchers are now known only from the vicinity of the Mojave Narrows. An existing biological opinion already covers take of habitat by flood control maintenance.

Protection of riparian habitat in other areas, but particularly the eastern Sierra canyons, is important to migratory willow flycatchers of all subspecies. Monitoring of the impacts of cattle grazing on the riparian habitat would be necessary to insure that degradation of the riparian habitat does not continue in some canyons.

Human activities can result in increased numbers of brown-headed cowbirds, which "take" willow flycatchers by nest parasitism. If monitoring shows adverse levels of parasitism, the adaptive management measure of cowbird trapping will assure that the conservation program continues to function effectively.

Take of habitat authorized by the Plan, which is limited to small projects such as trails and in within the riparian habitat such as invasive species removal and construction of trails, is fully mitigated by the conservation program of groundwater retention, migration habitat protection, restoration of habitat by removal of exotic species and monitoring and adaptive management.

4.2.2.6.12 Summer Tanager

This riparian neotropical migrant is now well-protected at Big Morongo Canyon ACEC, Mojave Narrows Regional Park, and potentially at Cushenbury Springs and Camp Cady. Maintenance of groundwater levels in the Mojave River is the primary provision of the West Mojave Plan that would offer additional conservation for the summer tanager. Maintenance of the riparian habitat between Victorville and Helendale would allow continued nesting of this species along the river corridor. Establishment of a Conservation Area at Big Rock Creek would protect additional habitat.

Enhancement of the habitat at Camp Cady by tamarisk removal and at Afton Canyon by continuing revegetation efforts would also serve to conserve and potentially increase the scattered populations of this species. Because all riparian areas where the summer tanager is known to nest are conserved, managed, or enhanced, the impacts of potential take are minimized and mitigated to the maximum extent practicable.

No take of summer tanager is anticipated. However, take would be allowed at a few privately owned locations, including the Yucca Valley golf course, though the current management is compatible with habitat requirements of the summer tanager. In addition, flood control maintenance, trail construction and invasive species removal in the Mojave River may result in short-term take of habitat. If the groundwater criteria for the Mojave River are not met

and the local nesting range within the Victorville/Alto sub-basin contracts to the Mojave Narrows portion of the river, that "take" of habitat would be compensated by acquisition of the riparian habitat at Big Rock Creek and enhancement of habitat at Camp Cady by tamarisk removal. Potential acquisition of farmland near Camp Cady, through the adaptive management program, would also stabilize or increase the groundwater levels underlying the riparian habitat in the Baja sub-basin. These actions would fully mitigate the take resulting from loss of occupied habitat elsewhere in the Mojave River.

4.2.2.6.Vermilion Flycatcher

This riparian neotropical migrant is now well-protected at Big Morongo Canyon ACEC and Mojave Narrows Regional Park. Maintenance of groundwater levels in the Mojave River is the primary provision of the West Mojave Plan that would offer additional conservation for the vermilion flycatcher. Maintenance of the riparian habitat between Victorville and Helendale would allow continued nesting of this species along the river corridor.

Take would be allowed at isolated sites, such as urban woodland sites in Ridgecrest. All large habitat blocks would be conserved, assuming that the groundwater criteria for the Mojave River are met. The incidental take is therefore minimized and mitigated to the maximum extent practicable. Take of habitat in the short term from flood control maintenance and small projects such as trail construction is fully mitigated by conservation of habitat with groundwater maintenance and by invasive species removal in the Mojave River.

Human activities can result in increased numbers of brown-headed cowbirds, which "take" vermilion flycatchers by nest parasitism. If monitoring shows adverse levels of parasitism, the adaptive management measure of cowbird trapping will assure that the conservation program continues to function effectively.

4.2.2.6.14 Western Snowy Plover

Site-specific protection measures at playas during the nesting season would be very beneficial to the Western snowy plover, which is extremely vulnerable to human disturbance. Alternative A would protect the nesting areas on a site-specific basis, which minimizes and mitigates to the maximum extent practicable. All current nest sites would be preserved, meeting the biological goal. Additional surveys would be undertaken as part of the monitoring program at Dale Lake, and if found, nest sites would be protected from human disturbance and salt mining operations. Though operations at Dale Lake, Searles Lake and other areas may remove nest sites during the non-nesting season (fall and winter), sufficient nesting habitat will remain when the birds return from migration and new nesting areas will be protected.

In high rainfall years where rising lake levels flood nesting habitat, no provisions are made to manage surface flow. This disturbance is considered to be part of the normal variation in nesting success, and snowy plovers do not show site fidelity to specific areas, so are believed to be able to accommodate and relocate nest sites to more suitable areas at the lake edge in these

instances. The same rationale applies to the temporary take of nest sites during the fall and winter. The impacts of this take of former nesting habitat is fully mitigated by protection of all snowy plover nests during the breeding season.

4.2.2.6.Western Yellow-Billed Cuckoo

No immediate benefit to the yellow-billed cuckoo would be apparent from protection and enhancement of riparian sites. Conversely, there would be no incidental take because no occupied habitat is known within the Plan area. This species is in a recovery mode, and maintaining the riparian vegetation in the Mojave River through groundwater management would provide habitat where the birds can expand their numbers and range. No incidental take is anticipated for this species, but flood control maintenance and small construction projects within the riparian zone may cause short-term alterations of habitat suitable for recovery. Suitable migration habitat would remain in the east Sierra canyons and in the Kelso Valley.

Monitoring of the impacts of cattle grazing on the riparian habitat (M-86) would be necessary to insure that degradation of the riparian habitat does not continue in some canyons.

4.2.2.6.16 Yellow-Breasted Chat

This riparian neotropical migrant is now well-protected at Big Morongo Canyon ACEC, Mojave Narrows Regional Park, and potentially at several canyons along the eastern Sierra Nevada Mountains. Maintenance of groundwater levels in the Mojave River is the primary provision of Alternative A that would offer additional conservation for the yellow-breasted chat. Maintenance of the riparian habitat between Victorville and Helendale would allow continued nesting of this species along the river corridor. Establishment of a Conservation Area at Big Rock Creek would protect additional habitat.

Enhancement of the habitat at Camp Cady by tamarisk removal and at Afton Canyon by continuing revegetation efforts would also serve to conserve and potentially increase the scattered populations of this species. Because all riparian areas where the yellow-breasted chat is known to nest are conserved, managed, or enhanced, the impacts of potential take are minimized and mitigated to the maximum extent practicable.

No substantial take of yellow-breasted chat habitat is anticipated. Flood control maintenance, trail construction and invasive species removal may alter riparian habitat in the short term. If the groundwater criteria for the Mojave River are not met and the local nesting range within the Victorville/Alto sub-basin contracts to the Mojave Narrows portion of the river, that "take" of habitat would be compensated by acquisition of the riparian habitat at Big Rock Creek and enhancement of habitat at Camp Cady by tamarisk removal. Potential acquisition of farmland near Camp Cady, through the adaptive management program, would also stabilize or increase the groundwater levels underlying the riparian habitat in the Baja sub-basin. These actions would fully mitigate the take resulting from loss of occupied habitat elsewhere in the Mojave River.

Human activities can result in increased numbers of brown-headed cowbirds, which "take" yellow-breasted chats by nest parasitism. If monitoring shows adverse levels of parasitism, the adaptive management measure of cowbird trapping will assure that the conservation program continues to function effectively.

4.2.2.6.17 Yellow Warbler

This riparian neotropical migrant is now well-protected at Big Morongo Canyon ACEC, Mojave Narrows Regional Park, and in several of the eastern Sierra canyons. Maintenance of groundwater levels in the Mojave River is the primary provision of Alternative A that would offer additional conservation for the yellow warbler. Maintenance of the riparian habitat between Victorville and Helendale would allow continued nesting of this species along the river corridor. Establishment of a Conservation Area at Big Rock Creek would protect additional habitat.

Because all riparian areas where the yellow warbler is known to nest are conserved, managed, or enhanced, the impacts of potential take are minimized and mitigated to the maximum extent practicable. Long-term assurances for groundwater to the Mojave River are not considered practicable by the signatory agencies to the HCP, since they do not regulate the actions of the water agencies and purveyors.

Minimal take of yellow warbler habitat is anticipated, consisting of small projects such as invasive species removal or trail construction. If the groundwater criteria for the Mojave River are not met and the local nesting range within the Victorville/Alto sub-basin contracts to the Mojave Narrows portion of the river, that "take" of habitat would be compensated by acquisition of the riparian habitat at Big Rock Creek and management of habitat through grazing restrictions in the east Sierra canyons. These actions would fully mitigate the take resulting from loss of occupied habitat in the Mojave River.

Human activities can result in increased numbers of brown-headed cowbirds, which "take" yellow warblers by nest parasitism. If monitoring shows adverse levels of parasitism, the adaptive management measure of cowbird trapping will assure that the conservation program continues to function effectively.

4.2.2.7 Reptiles

4.2.2.7.1 Mojave Fringe-Toed Lizard

The measures for protection of the Mojave fringe-toed lizard conserve the sand transport ecosystem function at Big Rock Creek and Saddleback Butte State Park, which is a very beneficial aspect of the West Mojave Plan. These measures adequately address flood control, windbreak and vehicle use problems. Acquisition of additional occupied habitat adjacent to Saddleback Buttes State Park would enhance the viability of the fringe-toed lizard population at that location and prevent further incidental take.

Along the Mojave River, the preferred alternative protects public land occupied habitat, but fails to address conservation on private lands. This could cause fragmentation of continuous populations along the river east of Barstow. Many of the private lands are already converted to agriculture, and fragmentation is already a problem. Acquisition of the remaining undeveloped lands in private ownership with occupied habitat would be desirable, but is considered impracticable at this time because 1) it adds substantial cost, and 2) it may not be essential as a habitat linkage. No routes of travel are designated for these lands. From Manix east, the Mojave Road is designated as open from Manix Wash through Afton Canyon and beyond. Additional open roads traverse blowsand habitat between Fourmile Waterhole and Ninemile Waterhole. These existing open roads do not appear to be impacting this species because of the very light use, but are not appropriate for conservation of the habitat for this vehicle-sensitive species. Alternative A would have a minor adverse affect on this population.

Acquisition of additional occupied habitat adjacent to Saddleback Buttes State Park would enhance the viability of the fringe-toed lizard population at that location and prevent further incidental take. Because the river wash is not developable, a connecting linkage is present and would remain between the public lands with occupied habitat.

In the Sheephole Valley, establishment of a conservation area on BLM lands outside the wilderness and National Park Service lands completes the conservation of lands constituting the habitat for this species. The 1985-1987 route designations allow travel on three primary routes across fringe-toed lizard habitat on BLM lands. The light travel on these routes, which cover about one-fourth of the occupied habitat, does not appear to be impacting this species. These routes provide access to mining claims and are part of a recreational loop. The Mojave fringe-toed lizard population in this area should remain secure for the indefinite future.

At Pisgah Crater, occupied blowsand habitat would be designated an ACEC and vehicle intrusion onto occupied habitat would be restricted compared to the present. Alternative A proposes closure of some, but not all, of the routes crossing suitable habitat, which would be a beneficial improvement. Additional closures of spur routes and redundant routes in sandy habitat west of Pisgah Crater are necessary to insure adequate protection of the lizards and their habitat from vehicle damage. Threats to the Mojave fringe-toed lizard would be largely removed by these conservation measures.

Alternative A would consolidate routes accessing the west slope of Alvord Mountain, closing several in the sandy washes. Access is maintained for the private land in this area, which is in a checkerboard pattern. This reduction in routes is beneficial to the Mojave fringe-toed lizard because it closes routes traversing occupied and potential habitat.

The occurrences of Mojave fringe-toed lizard at Alvord Mountain, Manix, and Cronese Lakes would be further conserved through selective acquisition of occupied habitat.

Taken as a whole, the conservation program meets the biological goal of conserving eight of the fourteen known occupied sites for the Mojave fringe-toed lizard. The remaining six areas would be subject to incidental take. These are judged to be impracticable to conserve for the following reasons:

- El Mirage – No recent records, occupied habitat very small, and occupied habitat is within an Open Area for vehicle use.
- Twentynine Palms – Occupied habitat is within the city limits.
- East edge of Harper Lake – no recent records, habitat fragmented, suitable habitat very small.
- Edwards AFB – Not a part of the West Mojave Plan.
- Fort Irwin – Not a part of West Mojave Plan.
- Mojave Valley – Habitat is irrevocably fragmented by agriculture and rural development.

Considering the practicability of conservation at each site, Alternative A minimizes and mitigates the impact of incidental take to the maximum extent practicable. The measures addressing ecosystem protection, interagency cooperation and acquisition, and set-aside of public lands for conservation combine to mitigate the loss of potential remaining populations at other sites.

Mojave fringe-toed lizard populations are conserved in all parts of the range within the West Mojave. This conserves genetic diversity within the species, which has a history of geographic isolation of populations and which is the subject of investigation to determine if the populations are genetically distinct. If so, they could qualify as "Evolutionarily Significant Units" or "Distinct Population Segments", terms used by the USFWS to define when a subset of a species can qualify for listing as threatened or endangered. Preliminary investigations (Morafka, 2000) have shown genetic differences among populations of the Mojave fringe-toed lizard. These potentially distinct taxa are conserved by the measures in Alternative A.

4.2.2.7.2 Panamint Alligator Lizard

The Panamint alligator lizard will not be a covered species. The Implementing Authority will record and compile new sightings of this species. When sufficient information is obtained to formulate a conservation plan, the Plan may be amended to include this species. Provisions of the Plan applicable to the Inyo California towhee will serve to protect the lizard's potential habitat.

4.2.2.7.3 San Diego Horned Lizard

The San Diego horned lizard has a rather wide range throughout southern California, and is protected by conservation lands within the San Diego MHCP, the adjoining North San Diego County HCP and parts of the North Orange County HCP. Proposed conservation in the Western Riverside County MSHCP would also fill in conservation gaps within the overall range of the species. The remaining edge of the range, in the Angeles and San Bernardino National Forests

and the desert foothills would be protected in the revised Forest Plans and within the West Mojave Plan to the extent possible.

A substantial portion of the foothill range of this lizard is already fragmented by rural development in Phelan and Oak Hills. Conservation at Big Rock Creek and in the Significant Ecological Areas near Mescal Creek would protect a representative portion of the desert foothill part of the range of the San Diego horned lizard. Connectivity to the east and west would be provided by habitat in the National Forests.

Conservation of the drainages on the north slope of the San Gabriel and San Bernardino Mountains by restricting flood control improvements applying building easements would retain patches of habitat for these lizards, but would not prevent further fragmentation of the intervening uplands. In addition, horned lizards occupying the watercourses may be subject to collection by children and predation by pets. This measure provides minimization, rather than conservation or mitigation of impacts. However, these areas would provide some extension of the conserved habitat in the National Forests.

Given the protection afforded by Wilderness, JTNP, the Carbonate Endemic Plants ACEC and the Big Rock Creek Conservation Area, and the management by route designation at Juniper Flats ACEC and in the Juniper route designation subregion, impacts on the San Diego horned lizard would be minimized and mitigated to the maximum extent practicable. Designation of a conservation area in San Bernardino County in the Oak Hills and Phelan where rural residences have already severely fragmented the habitat is not considered practicable. The conserved acreage is far greater than the incidental take area, meeting the fully mitigate standard.

4.2.2.7.4 Southwestern Pond Turtle

Existing protection of the southwestern pond turtles at Camp Cady Wildlife Area, Mojave Narrows Regional Park and Afton Canyon ACEC conserves the most important sites for this reptile in the West Mojave. However, maintenance of the groundwater in the Baja sub-basin of the Mojave River is essential to maintenance of the habitat at Camp Cady.

Enhancement of the habitat at Camp Cady by tamarisk removal and at Afton Canyon by continuing revegetation efforts would also serve to conserve and potentially increase the scattered populations of this species. Because all riparian areas of the Mojave River where the Southwestern pond turtle is known to occur are conserved, managed, or enhanced, the impacts of potential take are minimized and mitigated to the maximum extent practicable. Long-term assurances for groundwater to the Mojave River are not considered practicable by the signatory agencies to the HCP, since the local jurisdictions do not regulate the actions of the water agencies and purveyors.

No take of Southwestern pond turtle is anticipated. If the groundwater criteria for the Mojave River are not met and the local range within the Victorville/Alto sub-basin contracts to the Mojave Narrows portion of the river, that "take" of habitat would be compensated by

enhancement of habitat at Camp Cady by tamarisk removal. Potential acquisition of farmland near Camp Cady, through the adaptive management program, would also stabilize or increase the surface water and groundwater in the Baja sub-basin. These actions would fully mitigate the take resulting from loss of occupied habitat elsewhere in the Mojave River.

Expansion of the SEAs by Los Angeles County would provide additional protection of the remaining habitat for the southwestern pond turtle in the San Andreas Rift Zone west of Palmdale. It would not prevent illegal collection by children or herpetologists, and management of the SEAs in public ownership would be needed in the future.

4.2.2.8 Plants

4.2.2.8.1 Alkali Mariposa Lily

Establishment of a conservation area adjacent to Edwards AFB in the Rosamond Basin would be very beneficial to alkali mariposa lily at its core population.

Although the acreage of incidental take of alkali mariposa lily is large, few opportunities exist for conservation of undisturbed or unfragmented habitat. The conservation areas along the boundaries of EAFB are the only lands supporting occupied and suitable habitat for this plant that are not altered by agriculture, affected by changed hydrology, or fragmented by rural and urban development. The remaining portions of the Amargosa Creek discharge into the Rosamond Basin would be conserved, a measure which protects the extant hydrological processes. Restoration of some lands within the conservation area could increase the available suitable habitat. Considering the limited opportunities for conservation and the high cost of land (practicability), the conservation program in the Antelope Valley mitigates the take of this species to the maximum extent practicable.

Acquisition of isolated springs and seeps also contributes to conservation of alkali mariposa lily in other parts of its range. The Paradise Springs property supports a large and dense population and the land necessary to protect the ecological process (faultline spring). The same is true on a smaller scale for Rabbit Springs.

Botanical surveys of isolated springs, seeps and meadows may result in the detection of additional sites for this species. These would be conserved by adaptive management, which may include acquisition, fencing, route designation, or avoidance measures.

4.2.2.8.2 Barstow Woolly Sunflower

Alternative A would provide conservation of large blocks of habitat in all parts of the range of this restricted West Mojave endemic plant. Establishment of a secondary reserve as the North Edwards Conservation Area would extend the contiguous habitat of the largest population on military lands across jurisdictional boundaries.

Amending the Land Tenure Adjustment Project of the CDCA Plan would remove 1,143 acres of land that could be exchanged for acquisition of tortoise habitat in the Fremont-Kramer DWMA.

Alternative A's provision allowing the voluntary retirement of grazing allotments is expected to result in the elimination of the Pilot Knob allotment from the CDCA Plan. This would protect sunflower populations near Cuddeback Lake. Route designation, especially for through motorcycle routes, would restrict potential damage from off-road travel.

The proposed core reserve would allow coordinated management of BLM and CDFG lands northeast of Kramer Junction for conservation. Route designation in this area would benefit the Barstow woolly sunflower over the existing situation because larger blocks of undisturbed habitat would be created.

Adjustments to the core reserve in the southwest corner would allow Caltrans to make improvements to the Highway 58 / 395 intersection with the certainty that the highway project would provide adequate and suitable mitigation for the Barstow woolly sunflower.

Acquisition of private lands within other parts of the DWMA would provide unified conservation management of the habitat by BLM, preventing fragmentation from incompatible land uses on private parcels.

New construction within the utility corridors would avoid known populations or provide increased mitigation over the present requirement, which serves to conserve existing sites or provide funds to acquire occupied habitat elsewhere

Mineral withdrawals in the Coolgardie Mesa area would provide additional protection for the Barstow woolly sunflower at that location by eliminating the potential for new ground disturbance from mining.

Alternative A addresses nearly all known occurrences of Barstow woolly sunflower and establishes conservation areas and management addressing the entire range of this narrow endemic. It creates unified large blocks of managed habitat, hence minimizes and mitigates to the maximum extent practicable. Incidental take would be allowed for the Caltrans project, within the City of Barstow and on private lands outside conservation areas. Very few occurrences are now known in the incidental take areas, so the expected level of take would be minimal. Compared to new conservation, the incidental take is very small, so the State's fully mitigate standard is met.

4.2.2.8.3 Carbonate Endemic Plants

Creation of an ACEC for the four listed carbonate endemic plant species on the north slope of the San Bernardino Mountains, along with the management measures provided in the Carbonate Habitat Management Strategy, would conserve these species on both BLM and Forest

Service properties. Lands east of Highway 18 would be protected from mining by the land use standard of no surface occupancy. Acquisition from landowners and claimholders with valid existing rights would be compensated. Adoption of standard mitigation measures and reclamation and revegetation standards by San Bernardino County would reduce the time and money spent on obtaining individual permits for FESA compliance.

Exchange of BLM lands along the Lucerne Valley railroad spur would benefit the local economy by allowing industrial development in this area, and would benefit the carbonate plant species by obtaining private lands for conservation purposes. However, this exchange could result in the loss of two occurrences of Parish's daisy and one occurrence of Cushenbury milkvetch.

The carbonate endemic plant species are mostly within the Bighorn subregion for route designation. The routes within the habitat have been designated as limited, with motorized use restricted to claimholders, landowners and authorized persons. The terrain generally prevents off-road travel, and use of these roads is infrequent. Although past vehicle use has not been detrimental to the listed plant species, the limited designations in Alternative A would beneficially impact the plants and the critical habitat.

Occurrences of Parish's daisy in the Bighorn subregion near Vaughn Spring are avoided by the adoption of the 1985-1987 designations in the Western Mojave Desert Off Road Vehicle Designation Project. No routes traverse critical habitat in Section 22 (T 2N, R 3E).

West of Highway 18 (which is outside the Bighorn subregion boundaries) one limited and one open route cross critical habitat for Parish's daisy in Section 10, T 3N, R 1E). All other routes designated open west of the highway are outside known occupied habitat for all four carbonate species and outside designated critical habitat.

Existing fragmentation of the carbonate plants, a result of natural occurrence patterns and historical mining impacts, prevents conservation of a completely unified block of undisturbed habitat for these species. The CHMS does minimize and mitigate to the maximum extent practicable, recognizing the existing fragmentation and that restoration to native conditions is not possible in mined areas.

4.2.2.8.4 Charlotte's Phacelia

This plant faces few threats at present, being protected in the Owens Peak Wilderness, Red Rock Canyon State Park and in ACECs of the east Sierra Canyons. Alternative A would not alter the existing protections. Designation of routes in the El Paso Mountains via the community collaborative process would result in additional safeguards against habitat becoming disturbed by hillclimbs, parallel routes, and dead-end routes, assuming that these routes are closed.

Take of this plant is limited to private lands where new or isolated populations are found. The allowable take is less than 10% of the land conserved. The protection in Wilderness,

ACECs, and the State Park, along with route designation, minimizes take to the maximum extent practicable and the imposition of mitigation fees mitigates to meet federal standards.

The grazing program may improve habitat for Charlotte's phacelia on the slopes of the eastern Sierra Nevada Mountains. Health assessments would be completed within two years of plan adoption for the following cattle allotments within the range of this species: Hansen Common, Lacey-Cactus-McCloud, Olancha Common, Rudnick Common, Tunawee Common, and Walker Pass Common. Grazing impacts now are believed to be minimal, based on past practices and occurrence data for Charlotte's phacelia. However, monitoring is necessary to determine current grazing effects, which may have increased in the recent drought years. To the extent that grazing is managed to move cattle within the allotments and prevent concentrated grazing within occupied habitat, Charlotte's phacelia would benefit.

4.2.2.8.5 Crucifixion Thorn

Very few threats now exist to the isolated occurrences of crucifixion thorn. Creation of the Superior-Cronese DWMA and the Pisgah Crater ACEC would place eight of the ten sites within conservation areas. Reduction in the route network for both areas would benefit the species by establishing larger undisturbed habitat blocks, particularly in the crucifixion thorn "woodland" south of Fort Irwin.

Isolated occurrences in the Mojave Valley, such as the single plant found near Newberry Springs, would be subject to incidental take. Potential disturbance by existing mining and the Johnson Valley to Parker race in the Pisgah area may impact the habitat of crucifixion thorn, but stipulations attached to the event at the time would prevent damage to the rare plants. Protection of the larger occurrences exceeds the possible take of plants and habitat in isolated locations.

4.2.2.8.6 Desert Cymopterus

Alternative A would achieve a substantial improvement in conservation for desert cymopterus. Establishment of the North Edwards Conservation Area would limit incidental take and conserve the largest population, which extends north of Edwards AFB onto private lands. Remaining occurrences northeast of Kramer Junction would be protected within the Fremont-Kramer DWMA by the 1% limitation on allowable ground disturbance. Reduction of the route network in the Superior subregion will achieve better protection of the sandy habitat. Alternative A would achieve this by closing 251 miles of routes within the Superior subregion.

On public lands within the DWMA, botanical surveys would be required within the range of the cymopterus, and if found, avoidance would be mandated to the maximum extent practicable.

Grazing threats to desert cymopterus within the Pilot Knob allotment would be addressed by a prohibition on ephemeral use by cattle and by the allowance for retirement of the allotment if the permittee voluntarily relinquishes the lease. The Harper Lake and Cronese allotments may

also be retired. Grazing health assessments would be completed within two years for the Harper Lake allotment, which includes suitable habitat and two known locations for desert cymopterus.

In locations where desert tortoise and Mohave ground squirrel habitat overlap with occurrences or suitable habitat for desert cymopterus, acquisition of private lands would be a priority. Transfer of lands to public ownership would provide additional protection for desert cymopterus.

Incidental take would be limited to private land locations outside the DWMAs and to 1% of lands within the DWMAs and the North Edwards Conservation Area. Acreage of potential take is limited to 50 acres. Conservation would cover 7 of 8 polygons recorded for this species and 21 of 22 point locations outside military lands within the West Mojave.

Incidental take is minimized and mitigated by the establishment of the two conservation areas with their avoidance standards and compensation ratios. The private land available for take is less than 10% of the habitat conserved, so that the conservation plan meets the fully mitigate standard. Although the 1% limitation on allowable ground disturbance within the conservation areas could differentially affect desert cymopterus, development threats are few in these areas, and acquisition of lands containing this species will be a high priority. The State requirement that incidental take be in "rough lockstep" with conservation will assure that desert cymopterus does not decline in the West Mojave ahead of the pace of conservation.

Additional survey information for this species is most likely to detect new occurrences on public lands where threats are few.

4.2.2.8.7 Flax-like Monardella

Flax-like monardella will not be a covered species. The Implementing Authority will record and compile new sightings of this species. When sufficient information is obtained to formulate a conservation plan, the Plan may be amended to include this species.

Flax-like monardella faces no apparent threats within the Plan area. Designation of the Middle Knob ACEC would provide additional protection to the single known location.

4.2.2.8.8 Kelso Creek Monkeyflower

All public lands in the Kelso Valley would be designated as a conservation area and managed to require avoidance by developments on public lands. Cattle grazing would be monitored and managed to avoid occupied habitat. Monitoring of potential habitat would identify any need for changes in the conservation area boundaries or for implementation of adaptive management measures, including fencing along private land boundaries in the future. Acquisition of lands with multispecies values in the Kelso Valley would improve habitat contiguity for this species in the long term.

Although incidental take permits are not sought for Kelso Creek monkeyflower, this species could be added to the list of covered species in the future. This is because as additional botanical surveys better define the distribution and acquisitions over time provide better protection, sufficient occupied habitat would be conserved and managed on public lands to insure the long-term survival of the species.

The conservation program as structured on public lands would not avoid adverse impacts to the species without measures on private lands, where half the occupied habitat is located. Development threats are low in the Kelso Valley, allowing time for acquisitions and adaptive management measures to be implemented. One recent acquisition by the State has result in conservation of approximately 600 acres of occupied habitat. Actions outside the West Mojave boundary will also affect the species either positively or negatively for a portion of the range. Based on current knowledge of this species and the projected development trends, Alternative A would not have a significant impact on the Kelso Creek monkeyflower. This assumes some acquisition of additional private lands in the Kelso Valley. Because the range of this plant is so limited and the known occupied habitat so small in extent, any substantial loss of occupied habitat would be considered a significant biological impact.

4.2.2.8.9 Kern Buckwheat

Conservation of Kern buckwheat requires proactive management of the few known locations on public land and avoidance of occurrences on private lands. The preferred alternative provides these conservation measures consisting of providing barriers to exclude vehicles and restoration of widened routes and a parking and turnaround area in one location. No routes are designated as open within the occupied habitat for Kern buckwheat, and Alternative A would beneficially impact this very rare plant species.

Incidental take would be restricted to very small areas where restoration of roads and construction of fencing or other barriers to vehicle use are necessary. Take is estimated at 0.01 acres, while conservation totals all remaining habitat.

4.2.2.8.10 Lane Mountain Milkvetch

The reserve-level management meets all state and federal incidental take permit standards because it addresses existing threats, provides proactive management, and consolidates mixed ownership into blocks of public lands managed for the species.

Route designation is very important to Lane Mountain milkvetch. Direct impacts from vehicles to the plants and their habitat are not documented, and indirect impacts from casual use mining and off-road travel would be minimized by the additional route closures proposed by the Final EIR/S. In addition, the potential operations planned on the Fort Irwin expansion may result in the loss of substantial numbers of plants and acres of habitat, so that the remaining habitat on public lands on Coolgardie Mesa and the west side of the Paradise Range must be managed on a reserve-level basis. Mitigation provided by the Army for potential impacts could include

acquisition of occupied habitat on private lands and restoration and obliteration of roads on public lands.

The existing patchwork of private and public lands on the Coolgardie Mesa and the West Paradise Range where Lane Mountain milkvetch is found results in an incomplete network of access routes. If and when private land is acquired, additional routes may be designated as open or closed.

Alternative A closes many of the open routes on public lands in and near occupied habitat for this species, but is constrained by the necessity to provide access to the private lands. Access to mining claims is also provided. The West Mojave Plan proposes a mineral withdrawal for the occupied habitat. At the time claims are acquired or relinquished, certain routes within the habitat could be closed. The open designations consolidate access routes to popular destinations to the extent possible. However, Alternative A may not achieve the level of habitat conservation necessary to avoid indirect impacts to this species.

BLM and Army would implement the mitigation measures in order to achieve the conservation goals and objectives. The Biological Opinion on the Fort Irwin expansion recognizes the significant acquisition program of occupied habitat on private lands within the BLM's Conservation Areas.

4.2.2.8.11 Little San Bernardino Mountains Gilia

Known locations of Little San Bernardino Mountains gilia would receive far more protection than at present with the limitations placed on flood control improvements of desert washes in the Morongo and Yucca Valley areas. In addition, plants located downstream within the Coachella Valley would benefit from maintenance of upstream hydrology in Big Morongo and Dry Morongo Creeks.

The limitation on take would minimize impacts to this plant until more is known about its distribution and extent of occupied habitat. This conservative approach to habitat conversion would be beneficial to the species.

If no new occurrences of Little San Bernardino Mountains gilia are detected, the species is still somewhat at risk, even given the measures that protect its desert wash habitat. Although building would not be permitted within occupied habitat, casual use by off-highway vehicles could damage or destroy known sites and promote the spread of invasive weeds. Control of casual (illegal) use by motorcycles and all-terrain vehicles is beyond the capability of local law enforcement, and would depend on enforcement by adjoining homeowners. This enforcement appears to be good in Quail Wash outside JTNP, but non-existent north of Highway 62 in the small tributaries flowing into Coyote Lake. BLM, the County Sheriff and community interests in Wonder Valley are working to alleviate this problem.

From a planning perspective, incidental take of Little San Bernardino mountains gilia is minimized and mitigated to the maximum extent practicable. The limited allowable incidental take is fully mitigated by protections of the wash habitat. Monitoring and adaptive management would address protection needs in the future.

4.2.2.8.12 Mojave Monkeyflower

Creation of two regions as the Mojave Monkeyflower Conservation Area would greatly benefit this West Mojave endemic by preventing fragmentation and providing for focused public land management. Cessation of sheep grazing and restricting vehicle access within the conservation area would remove the primary threats to the species in the Brisbane Valley. Stipulations on utility development and acquisition of private land inholdings would provide conservation in the Ord-Newberry Mountains area.

The Mojave monkeyflower is affected by route designation in the Ord subregion and in the Brisbane Valley, which is not within a subregion. In the Ord subregion, 390 miles of routes would be closed under Alternative A. Those roads within washes west of Camp Rock Road and near the transmission line that are closed would beneficially impact Mojave monkeyflower habitat by excluding vehicles from occupied habitat and by consolidating the potential habitat into large, disturbance-free blocks. Consolidation of the network near the Azucar Mine by closure of redundant roads is a positive impact to this species.

In the Brisbane Valley, travel on roads is not a threat, but off-road travel is extensive in places. The new designations and enforcement provisions of the Plan would beneficially impact the Mojave monkeyflower in this region.

Incidental take would be limited to portions of the southern Brisbane Valley in the Oro Grande mining area and to private lands outside the conservation areas. Limited take might occur with new projects (if any) constructed in the utility corridors. Take would be mitigated by payment of fees as compensation and avoidance to the maximum extent practicable. The maximum allowable take of 9,300 acres is fully mitigated by the conservation measures imposed on 47,000 acres of occupied and suitable habitat. Actual incidental take is likely to be far less, because the rocky terrain utilized by miners is not all occupied habitat and because the mining industry may establish a private mitigation bank within the mining area for this plant.

4.2.2.8.13 Mojave Tarplant

Existing occurrences of Mojave tarplant are protected within wilderness and BLM ACECs. Incidental take would apply only to newly detected occurrences, and would not exceed the acreage of occupied habitat conserved.

The primary needs of this species are proactive management and the ability to detect any threats or adverse changes to the occupied habitat. No existing threats have been identified at the Cross Mountain and Short Canyon sites. Monitoring would establish a baseline of conserved

occupied habitat. These measures would benefit Mojave tarplant by providing the ability to track the number of plants and acres of habitat of this little-known species over time and to provide protective management if threats arise. The existing situation, while not posing harm to the species, does not positively address conservation.

The historical occurrence near Mojave Forks dam has probably been extirpated. If the species were re-discovered in this area in the future, as in Grass Valley or other parts of Las Flores Ranch, adaptive management would be required to conserve plants in this area.

The cap on incidental take and requirement for 50% conservation would assure that any future impacts are fully mitigated, and the installation of a monitoring program to record the population status of known occurrences would greatly benefit this species. Minimization and mitigation measures in place now include cattle fencing and cattle guards on road access points, and additional grazing management may be required in the future on Cross Mountain or other areas where the species might be detected.

4.2.2.8.14 Parish's Alkali Grass

If acquisition of the single site (with two separate landowners) supporting this species is successful and management by a local non-profit organization put into place, complete conservation of Parish's alkali grass would be achieved within the western Mojave Desert. Monitoring includes botanical surveys of other alkali springs, seeps, and meadows that could result in the detection of new locations. Adaptive management would conserve these sites.

No incidental take for Parish's alkali grass is contemplated. The potential for minimal incidental take exists at newly detected locations. Limited development on the properties near Rabbit Springs would include avoidance of 90% of the occupied habitat. If additional sites for this species are located in the future, a small amount (10%) of incidental take is possible. In that case, mitigation would be imposed by the local jurisdiction on a site-specific basis.

4.2.2.8.15 Parish's Phacelia

Alternative A addresses potential threats from development within the utility corridor and straying of vehicles from the Manix Trail onto the playa by requiring avoidance, soil stockpiling, and restoration in addition to prohibiting vehicles on the playa. Acquisition of the private parcels adjoining and including part of the known population would bring the entire site into public ownership in the long term.

Incidental take is minimized and mitigated by these conservation and management measures, and is fully mitigated by the acquisition. Take would not exceed five acres, while the ultimate conservation would total approximately 900 acres.

4.2.2.8.16 Parish's Popcorn Flower

Successful acquisition of the single known location would eliminate potential incidental take of this restricted wetland endemic. Monitoring includes searches of other desert wetland springs, seeps and meadows where Parish's popcorn flower might be found, and adaptive management would formulate conservation plans for the lands, depending on their ownership. The requirement for 90% conservation at newly-discovered sites would mitigate adverse impacts to this species.

4.2.2.8.17 Red Rock Poppy

Conservation provisions of Alternative A would represent no change from the existing situation for Red Rock poppy. Three quarters of the population is protected within Red Rock Canyon State Park, with the remainder occurring in the public lands of the El Paso Mountains. Threats are not apparent, but vehicle traffic off established roads could damage plants or their habitat.

The monitoring and adaptive management provisions address the needs of this species. No program now exists to track and record changes in the number of plants or acreage of occupied habitat. Alternative A would require a population census every five years, in coordination with the California Department of Parks and Recreation. In addition, the botanical surveys at additional alkali seeps, springs, and meadows may result in new occurrences of this species.

The community-based collaborative route designation process for the El Paso Mountains would consider the range and local distribution of the Red Rock poppy. The resulting network of open roads and trails may eliminate parallel routes, hill climbs, and straying off established paths, especially in Mesquite Canyon. This would improve conservation for the Red Rock poppy by creating larger areas of undisturbed habitat for it to grow.

4.2.2.8.18 Red Rock Tarplant

Conservation provisions of Alternative A would represent no change from the existing situation for Red Rock tarplant. However, the monitoring and adaptive management provisions address the needs of this species. No program now exists to track and record changes in the number of plants or acreage of occupied habitat. Alternative A would require a population census every five years, in coordination with the California Department of Parks and Recreation. In addition, the botanical surveys at additional alkali seeps, springs, and meadows may result in new occurrences of this species.

The community-based collaborative route designation process for the El Paso Mountains would consider the range and local distribution of the Red Rock tarplant, now limited to Red Rock Canyon and Last Chance Canyon within the State Park. The resulting network of open roads and trails may eliminate parallel routes, hill climbs, and straying off established paths that

pass near seeps and springs. This could improve conservation for the Red Rock tarplant by creating larger undisturbed areas at potential habitat near alkali springs.

Adaptive management would address any newly detected occupied habitat. Take would be limited at newly found sites to a level not exceeding the area under conservation.

4.2.2.8.19 Reveal's Buckwheat

Reveal's buckwheat will not be a covered species. The Implementing Authority will record and compile new sightings of this species. When sufficient information is obtained to formulate a conservation plan, the Plan may be amended to include Reveal's buckwheat. This species faces no apparent threats within the Plan area.

4.2.2.8.20 Salt Springs Checkerbloom

If acquisition of the single site supporting this species is successful and management by a local non-profit organization put into place, complete conservation of Salt Springs checkerbloom would be achieved within the West Mojave. Monitoring includes botanical surveys of other alkali springs, seeps, and meadows that could result in the detection of new locations. Adaptive management would conserve these sites.

No incidental take for Salt Springs checkerbloom is contemplated. Limited development at Rabbit Springs would include avoidance of 90% of the occupied habitat. If additional sites for this species are located in the future, a small amount (10%) of incidental take is possible. In that case, mitigation would be imposed by the local jurisdiction on a site-specific basis.

4.2.2.8.21 Shockley's Rock Cress

Alternative A would establish an ACEC for the carbonic endemic plants near Lucerne Valley and protect all known locations. Incidental take could occur in potential habitat to the west of Highway 18, where mining and related uses would be allowed. This take is minimized and mitigated to the maximum extent practicable with the adoption of the interagency Carbonate Habitat Management Strategy, and by the limitation on vehicle travel within the ACEC.

4.2.2.8.22 Short-joint Beavertail Cactus

No specific protection for the short-joint beavertail cactus now exists within the West Mojave Plan boundaries, where all known occurrences are on private lands. However, the Los Angeles County Significant Ecological Areas zoning overlay appears to have limited rural development in the foothills near Mescal Creek and Big Rock Creek. Substantial additional occurrences are found to the south on Forest Service lands in Los Angeles and San Bernardino counties. Alternative A would be very beneficial to this species by providing for conservation through land acquisition in the Big Rock Creek Conservation Area.

Incidental take would be allowed on private lands in the remainder of the range between Palmdale and Cajon Pass. Although large in area, occurrences outside the Mescal Creek and Big Rock Creek drainages are scattered between existing rural developments on vacant lots and have no long-term feasibility for conservation. Provisions of Alternative A to require setbacks along all major drainages allows for some limited continuity of conserved plants in this part of the range with those protected by the Forest Service.

Because Alternative A conserves the only remaining large habitat blocks for short-joint beavertail cactus, it minimizes impacts on the maximum extent practicable. Mitigation is provided through compensations and acquisition of the only private lands that are available. The potential take, while large in acreage, is fully mitigated because the conservation area protects the highest quality habitat for this species.

4.2.2.8.23 Triple-ribbed Milkvetch

Conservation needs of triple-ribbed milkvetch are met by protection of Big Morongo and Dry Morongo Creeks from flood control improvements and the requirement of avoidance at all sites on public lands. This plant is so rare and so poorly known that it must be addressed through monitoring and adaptive management. The requirement for botanical surveys on all discretionary projects within five miles of known locations meeting the requirements for potential habitat would provide some protection against incidental take by errors of omission. If new occurrences were detected on public lands, they would be avoided. Projects on private lands would be evaluated on a case-by-case basis, with a first priority being site acquisition using the plan-wide mitigation fees or other funding that might be available.

The conservation strategy minimizes and mitigates to the maximum extent practicable and is intended to avoid loss of any plants. Given that this species is so rare and so poorly known, adaptive management will play an important role in ultimate conservation of the species.

4.2.2.8.24 White-margined Beardtongue

The only apparent threats to white-margined beardtongue are construction within the utility corridor north of Pisgah Crater and at the Pisgah electrical substation and off-road travel within the occupied habitat in washes draining the Cady Mountains. Alternative A addresses these threats by adopting the June 30, 2003 route designations for this area, which consisted of the 1985-87 designations with specific modifications to prohibit travel in Argos Wash and other locations with occupied habitat. Establishment of an ACEC and route network at Pisgah Crater and acquisition of one private parcel with occupied habitat, if feasible, would provide additional conservation. Closure of spur routes crossing washes northeast of Pisgah Crater will beneficially impact the white-margined beardtongue.

Take would be allowed on private lands outside the Pisgah Crater ACEC, but is expected to be minimal. Allowable take, limited to the mining operations near Pisgah and utility construction where avoidance is infeasible, is fully mitigated by the management measures

described above. The conservation strategy minimizes take by requiring avoidance and mitigates to the maximum extent practicable by conserving the largest segments of occupied habitat in the washes draining the Cady Mountains.

4.2.3 Socio-Economics

4.2.3.1 HCP Program Components Affecting Urban Growth and Fiscal Revenue

Components of the Habitat Conservation Plan (HCP) program components likely to have the greatest potential affect on the socio-economic environment of the planning area include the following:

- Habitat Conservation Areas (HCA's) – selected land areas where urban development will not be permitted or will be restricted to a maximum 1.0 percent allowable ground disturbance (AGD) in order to conserve habitat environments deemed necessary for the survival of threatened or endangered species.
- Incidental Take Permitting Costs – intended to reduce risk and ambiguity inherent to the current Section 10a (FESA) and Section 2081 (CESA) permitting process. Amended regulations prescribe alternative requirements, each with associated cost (presence-absence surveys, clearance surveys, monitoring, and mitigation fees) that varies based on the geographic location of private property within the planning area.
- Specific Agency Procedures – Agency prescriptions of conduct and resource utilization for grazing, mining, and recreation activities (Best Management Practices, etc.) intended to minimize undue impacts on threatened and endangered species.

Each of the above program components will influence distinct forms of socio-economic activity within the planning area including land development, cattle grazing, resource mining, recreation, and associated employment. Whether such influence can be reasonably expected to create a significant impediment for future socio-economic activity and growth throughout the area merits consideration.

Habitat Conservation Areas (HCA's) constitute areas where minimal disturbance to the existing habitat is sought. In all about 2.5 million acres of planning area land in the four-county area is proposed for HCA designation, including roughly 575,000 acres of private property planned for acquisition and permanent placement as habitat open space. The degree to which acquisition and placement of private property could reduce the growth capacity of the planning area is examined below, as is the affect on property tax revenue streams benefiting local city and county governments.

Incidental Take Permit Costs: The HCP program would establish a mitigation fee as compensation for habitat disturbance within the West Mojave. A key objective of the mitigation fee is to supplant ambiguity and cost uncertainties associated with the current myriad of endangered species regulations with a greater level of certainty defined by scheduled mitigation expense. The mitigation fee will apply to all new ground-disturbance activities (real estate

development primarily) that fall within the jurisdiction of all City and County agencies participating in the HCP program. The HCP clearly directs the determination of the mitigation fee to be based on "the average value of an acre of private land to be acquired for implementation of this plan."

The mitigation fee drives the HCP compensation framework. The mitigation fee component of the HCP program is characterized by a tiered compensation schedule that reflects the priority assigned to West Mojave sub-locations for habitat conservation. The tiered schedule simply reflects predetermined multiples of the baseline average land value describing target properties for habitat conservation. Within the HCA's and areas reflecting the highest conservation priority, the scheduled fee would be is five times the average land value; in West Mojave sub-locations largely impacted by existing development or that otherwise reflect a lower priority for habitat conservation, the mitigation fee is one-half the reference land value; and in all other areas of the West Mojave, the mitigation fee is equal to the average reference value of HCA target properties.

Other costs of obtaining a Section 10(a) and/or a Section 2081 permit would also vary depending on the location of a new project. Survey and permit drafting costs would differ among areas established for the tortoise, including DWMAs, the Survey Area and the No Survey area.

Table 4-35 compares the present costs for developing a 10-acre parcel to costs under Alternative A. The table assumes an average land value for HCA habitat conservation target properties of $770/acre (see Chapter 3), and that CDFG endowment fees would no longer be assessed. The table is presented as an example only; utilizing different land values would change the figures accordingly.

Table 4-35 shows that the costs under Alternative A would be significantly lower in the No Survey and Survey Areas, which are also the regions where most of the development has and would likely occur in the future. Available data indicate that 23,333 of 47,538 (49%) structures digitized from 1995 aerials are within the No Survey Area, with the remaining 24,205 (51%) occurring within the Survey Area. Since most of these structures occur outside proposed DWMAs, there is an equal likelihood that both Survey Areas and No Survey Areas outside DWMAs would be developed at similar rates. Charging relatively lower fees (1/2:1) for degraded habitat, lifting survey requirements in areas where dozens (or hundreds) of surveys have revealed no tortoises, and other measures associated with Alternative A would lessen conservation costs incurred by the average developer.

Table 4-35
Private Land Permitting Costs For a Typical 10-acre Parcel

	CURRENT SITUATION	ALTERNATIVE A		
		DWMA	OUTSIDE HCA	
			TORTOISE SURVEY AREA	TOROTISE NO SURVEY AREA
Presence-absence Survey	$125-1,250	$125-1,250	$0	$0
Permits Drafted • Cost • Timeframe	 $5,000-65,000 1 - 5 years (3 years average)	 $0 No Delay	 $0 No Delay	 $0 No Delay
Other Surveys • Clearance Survey • Weekly Monitoring	 $250-2,500 $350-500	 $250-2,500 $350-500	 $250-2,500 $350-500	 $0 $0
Compensation • Mitigation Fee • Endowment Funds	 $23,100 $295	 $38,500 $0	 $7,700 or $3,850 $0	 $7,700 or $3,850 $0
Total Costs	**$29,120 to $90,545**	**$39,225 to $43,750**	**$8,300 to $10,700 in 1:1 area, $4,450 to $6,850 in ½:1 area**	**$7,700 in 1:1 area, $3,850 in ½:1 area**

Note: Survey and No Survey Lands within the HCA but outside the DWMA would incur the costs set forth above, with the addition of the HCA mitigation fee.

The current Section 10 and Section 2081 permitting process does not necessarily apply to all private property in the planning area but remains a pervasive concern for private property developers. As such, current regulations effectively impose a high degree of uncertainty related to cost and time and add to the underlying risk of developing private property in many areas of the West Mojave. By comparison, the incidental-taking permit fees under Alternative A will apply equally throughout the planning area based on identified prescriptions of environmental remedy within designated areas. In short, all private property in the planning area is subject to the amended regulations but in return a reasonably predictable range of environmental remedy and associated cost is established. As example, the amended regulations can be expected to involve a cost of about $3,850 to satisfy prescribed environmental remedy before a 10-acre parcel located in a "No Survey Area" and "0.5-to-1.0 Mitigation Fee Zone" of the West Mojave can be developed. Private property development under the current regulatory situation might not involve the same level of cost but most likely involves costs ranging anywhere from $27,000 to $95,000 with significant time delays.

FESA Section 7 Consultations: Implementation regulations for FESA Section 7 mandate the time frames given for review (45 days) and writing (90 days) of biological opinions, so these time frames are not likely to change. However, the establishment best management

practices, salvage protocols, handling guidelines, reporting requirements on standard data sheets, and predictable fees would identify standards, streamline the process, and facilitate consistent decision-making, so that the Section 7 process would be simplified and streamlined for the permitting agency (USFWS), Federal Lead Agency (BLM and others), and project proponent.

Assuming that the boundaries of tortoise critical habitat located on non-military lands are modified to conform to the DWMA boundaries, the adverse modification of critical habitat (the habitat analogue to a species' jeopardy opinion) would equate to the adverse modification of DWMA lands.

Alternative A would not directly affect Section 7 consultations between the USFWS and Department of Defense. However, considerable new information and field data would be available to the USFWS to determine take of animals and loss of habitat from the Western Mojave Recovery Unit, tortoise trends in the various DWMAs, general welfare of tortoises on permanent study plots, and other matters outside military installations. This information would allow the USFWS to better judge the cumulative effect of a given action proposed on, or by, one of the installations, and provide the regional context in which to determine the significance of the impact, and if it would result in jeopardy. If the plan is failing to recover tortoises on BLM lands, the USFWS would have that information when future Integrated Natural Resource Management Plans are being formulated for the installations (currently at five-year intervals), or there is a proposal for military training outside existing installations.

Specific Agency Procedures: Standards that are an integral part of Alternative A for private land development would also be applied to federal projects. Examples include: (a) implementation of BMPs in both DWMAs (more stringent BMPs) and Survey Areas (less stringent BMPs); (b) revegetation of pipelines in DWMAs; (c) 1% Allowable Ground Disturbance on BLM lands within the HCA; and d) Habitat Credit Component program.

Other procedures would be applied by the BLM to minimize inconsistencies among existing biological opinions and different federal lead agencies. Examples include: (a) means by which cattle and sheep would be grazed on each allotment; (b) regulation of dual sports events in DWMA versus non-DWMA lands; (c) competitive racing event guidelines applied inside and outside DWMAs; (d) oversight procedures for filming activities, especially in DWMAs; and (e) fire management in DWMAs versus outside DWMAs.

All foreseeable projects of the Federal Highway Administration, as administered by the California Department of Transportation, would be covered by the plan. CalTrans would have its own 1% AGD, streamlined permitting, and predictable mitigation. In return, CalTrans would locate major highway and freeway construction within previously identified corridors and coordinate mitigation with other Plan entities (such as highway fencing).

Activities by other federal agencies (such as the National Park Service and U.S. Army Corps of Engineers) would not be directly affected by the plan.

4.2.3.1.1 Urban Growth

Projected Regional Growth: The West Mojave represents a peripheral employment and housing market in the context of the Southern California economy, of which it is largely a part. As such, future growth in the West Mojave is linked to the level of growth anticipated throughout the entire region. Several agency sources have been compiled and referenced to describe projected long-term growth within the seven-County region evaluated above in terms of historic trends. For the explanation of sources and methods used to forecast regional growth, refer to the Socio-Economic Analysis in Appendix N.

Projected Study Area Growth: Exhibit 14 in Appendix N summarizes two alternative projections of long-term population and housing growth in the West Mojave. The indicated projection period is 35 years and is intended to reflect enough time for HCP Project adoption (2 to 3 years) and the subsequent 30-year implementation period. The growth projections are further summarized in Table 4-36.

Table 4-36
Comparative Summary Of West Mojave Population Projections

PROJECTION ALTERNATIVE	2000	2035	CHG 00-35	AVG. YRLY. RATE
COG/DOF Driven Projections	795,000	1,706,500	911,500	2.21%
Trend Adjusted Projections	795,000	1,379,500	584,500	1.59%
Difference:	-	(327,000)	(327,000)	n.a.
Difference As % of COG/DOF:	0.0%	23.7%	55.9%	

Source: Alfred Gobar Associates.

By 2035, the population base of the West Mojave is projected to range from 1.38 to 1.71 million residents based on the two alternatives. The high-end projection reflects COG-based projections prepared for specific city locations from 2000 to 2020 and extended to 2035 using the same least-squares technique applied to regional projections. The lower projection reflects an adjustment to the COG-based projection based upon review of market capture trends since 1990 and General Plan Growth policies. Both sets of projections reflect alternative views about probable market capture within the West Mojave area relative to broader regional trends.

Projected Study Area Growth vs. Planned Capacity: Overall, long-term housing growth throughout the West Mojave is projected to consume between 35.0 and 43.0 percent of total housing development capacity inherent to local General Plan policy. Within the eleven West Mojave cities where the bulk of future housing development is projected to occur, between 42.0 and 50.0 percent of current housing capacity will be consumed by 2035. By comparison, only 26.0 to 33.0 percent of current housing capacity designated in the unincorporated sections of the West Mojave would be consumed over this period. Within each of the respective subareas, future housing growth is not expected to pressure current policy capacity, with the exception of the Inyo subarea. In effect, current housing development policy describing the West Mojave

overall, the eleven West Mojave cities as a whole, and each West Mojave subarea is not expected to constrain the total supply of long-term housing growth.

Within selected areas of the West Mojave, local land use policy can be expected to limit the ability to satisfy market demand for additional housing in the distant future. Policy-induced constraints on market-driven demand reflect a localized development issue that will likely result in a shifting pattern of growth somewhat different than has characterized local areas during the past decade. Even under the most aggressive projection, significant potential for policy constraints on housing growth is limited to the City of Lancaster, City of Palmdale, City of Ridgecrest, and the Inyo subarea. Within the Antelope Valley cities, current residential land use policy is not expected to represent a potential constraint on projected growth until after 2020. The theoretical timing of policy restrictions on future housing in the City of Ridgecrest and Inyo subarea is less distant, on the order of 10 years based on the more aggressive growth projection.

Identified growth capacity far exceeds overall levels of growth projected to occur over the long term, with a few limited exceptions. The current supply of land designated for development, therefore, does not represent a compounding issue that must be considered when evaluating the material effect of the HCP program on area growth potential over the next 35 years.

Nonresidential Growth: Current General Plan land use policy designates approximately 241,000 acres for various forms of nonresidential development (office, retail, industrial, and institutional). It is estimated that roughly 160,000 acres of developed commercial land use is the supply base required to support a mature self-generating economy at buildout in the planning area. If the West Mojave were to constitute a self-generating economy with a base population of 1.38 million residents in 30 to 35 years (highly aggressive outlook), roughly 45,000 to 50,000 acres of nonresidential development will be required or about 20.0 percent of the current designated supply.

The likely impact of HCA designations on the potential for nonresidential development throughout the West Mojave is insignificant. The majority of land area designated for nonresidential development is situated within existing City Limit boundaries, while the preponderance of land area proposed for HCA designation is located in remote settings of the unincorporated planning area. The proportionate mix of nonresidential land use throughout the West Mojave is summarized in Table 4-37.

Table 4-37
Proportionate Mix of Non-residential Land Use

Locational Criteria	Office	Retail	Indust.	Inst.	All Nonresidential	
					Incl. Inst.	Excl. Inst.
WEMO Total (Ac.)	14,049	44,014	104,865	77,949	240,879	162,930
WEMO Mix	5.8%	18.3%	43.5%	32.4%	100.0%	67.7%
WEMO Cities	71%	73%	55%	15%	46%	61%
Uninc. Subareas	29%	27%	45%	85%	54%	31%

The current City-based supply of nonresidential land is two times the amount likely required to host all nonresidential development throughout the planning area over the next 30 to 35 years. In addition, about 88.0 percent of projected West Mojave population and housing growth is expected to occur within the eleven West Mojave cities. The reality is that very little, if any, nonresidential land is currently designated within proposed HCA boundaries. Due to location requirements for many nonresidential activities, it is also highly unlikely that any significant amount of land (exceeding the 1.0 percent AGD) within proposed HCA boundaries would be built, absent the HCA designation.

Residential Growth: Residential construction constitutes the land use most likely to result in the greatest amount of permanent ground disturbance (subdivision grading) among all forms of development commonly associated with economic growth in the West Mojave. As such, residential growth is also more likely than any other form of development to be affected by habitat conservation and protection policies of the HCP program.

Table 4-38 summarizes projected long-term housing development throughout the planning area. As shown, the most probable outlook of future growth indicates that roughly 258,000 additional housing units (mostly single-family detached units) will be constructed throughout the West Mojave over the next 35 years. Also shown is whether or not a given jurisdiction includes land (regardless of land use designation) within proposed HCA's, survey areas, or mitigation fee zones that dictate the scope of environmental remedy and associated cost needed to obtain construction permits.

The vast majority of private property within HCA boundaries (roughly 575,000 acres), however, is located in remote unincorporated reaches of the West Mojave where General Plan policies tend to designate land use for open space, agriculture, resource development, and other uses requiring little or no building area. The most probable impact of the HCA designation on long-term potential for housing development throughout the West Mojave is negligible for a number of reasons.

- General Plan densities in the HCA's rarely exceed a maximum of 0.2 dwelling per acre (minimum lot size – 5 acres but more often 20 to 40 acres).
- Market demand for housing in such remote locations is only a fraction of the demand for housing in West Mojave Cities.
- Remote desert locations often include a disproportionate share of housing used for seasonal and vacation purposes versus permanent residency.
- In abundance of suitable sites outside the proposed HCA's will continue to exist throughout the West Mojave to meet demand for housing in remote locations, particularly seasonal and vacation housing.

All areas of the West Mojave will be subject to CESA/FESA compliance and associated costs identified under Alternative A. The effect of such cost on long-term housing potential in the planning area depends on the effective cost burden or benefit created for housing developers and prospective homebuyers. The level of effect also depends on the corresponding density of

housing that will be built in any given location. The vast majority of future housing throughout the West Mojave can be expected to reflect production housing built and marketed by private developers as a price-competitive alternative to more costly homes within Santa Clarita Valley, Western San Bernardino County, and Coachella Valley.

Table 4-38
Projected Housing Unit Growth in West Mojave Study Area

Selected WEMO Locations	WEMO Area Projected Growth[1] Total DU's In 35 Yrs	Avg Du's Per Year	Share of Growth	Potential Sites In HCA and Fee Area[2] DWMA 5.0:1.0	Survey Area 1.0:1.0	Survey Area 0.5:1.0	No Survey Area 1.0:1.0	No Survey Area 0.5:1.0
San Bernardino Subarea								
29 Palms	3,950	113	1.5%	Neg'l	X	X	n.a.	X
Adelanto	6,130	175	2.4%	n.a.	X	X	n.a.	X
Apple Valley	6,120	175	2.4%	n.a.	X	Neg'l	n.a.	X
Barstow	3,120	89	1.2%	Neg'l	X	X	X	X
Hesperia	20,750	593	8.1%	n.a.	n.a.	n.a.	X	X
Victorville	22,880	654	8.9%	Neg'l	X	X	X	X
Yucca Valley	600	17	0.2%	n.a.	X	X	n.a.	X
Unincorporated Area	23,560	673	9.1%	X	X	X	X	X
Subarea Total	87,110	2,489	33.8%					
Los Angeles Subarea								
Lancaster	75,810	2,166	29.4%	n.a.	X	n.a.	X	X
Palmdale	56,220	1,606	21.8%	n.a.	X	n.a.	X	X
Unincorporated Area	21,870	625	8.5%	X	X	X	X	X
Subarea Total	153,900	4,397	59.8%					
Kern Subarea								
California City	1,020	29	0.4%	X	X	X	n.a.	X
Ridgecrest	5,020	143	1.9%	n.a.	X	n.a.	X	X
Unincorporated Area	10,380	297	4.0%	X	X	X	X	X
Subarea Total	16,420	469	6.4%					
Inyo Subarea								
Subarea Total	80	2	0.0%	n.a.	n.a.	n.a.	X	X
WEMO Study Area:	257,510	7,357	100.0%					
WEMO Area Cities:	201,620	5,760	78.3%					
WEMO Outlying Areas:	55,890	1,597	21.7%					

Note:

[1] Based on COG projections adjusted to reflect market capture trends within the WEMO area.

[2] Identifies whether or not stated jurisdiction includes land (regardless of designation) within each geographic area requiring alternative levels of environmental remedy. The DWMA essentially describes designated HCA locations. Fee areas describe alternative ratios of the average per acre value of private HCA property ($770 per acre) required as a mitigation fee

Source: Alfred Gobar Associates

Table 4-39 identifies the effective cost per unit associated with CESA/FESA compliance under Alternative A. The cost is described relative to the development of a typical 10-acre parcel. The effective cost per unit varies on the basis of several factors including; the form of remedy corresponding with the site (DWMA, Survey Area, No Survey Area), the mitigation fee zone (5:1, 1:1, or 0.5:1), and the effective gross density used to characterize residential development for a given city or county subarea (2.09 units per acre, 4.41 units per acre, etc.). Also shown is the effective cost per unit described as a percentage of estimated average new home value in the area during 2002. Finally, the cost of complying with existing CESA/FESA permitting regulations is also identified in terms of cost per unit and share of unit value.

Current, CESA/FESA regulations represent an effective cost burden ranging from $1,702 to $9,146 per unit based on high-range estimates. For future residential built in the "Survey" and "No Survey" areas of the West Mojave, the cost associated with Alternative A represents a cost-savings benefit compared to existing regulations. As example, the environmental permitting process is estimated to involve a cost ranging from $184 to $512 per unit for residential subdivision development in Yucca Valley, compared to potential cost ranging from $1,293 to $4,332 per unit, excluding associated 1 to 3 year processing delays, under current CESA/FESA regulations. As the Yucca Valley example demonstrates, Alternative A establishes a certain and predictable cost structure for all residential development that is 60.0 to 96.0 percent less expensive than the likely but uncertain cost exposure that exists under current CESA/FESA permitting regulations.

In light of recent trends throughout the State where significant capital improvement and habitat conservation fees are being imposed, the implicit cost burden of the amended permitting regulations for "Survey" and "No Survey" locations is not considered a significant impediment to the long-term growth of West Mojave housing resources. For roughly 75.0 to 80.0 percent of the future West Mojave housing stock, the amended permitting cost structure does not add more than 0.3 percent to the estimated average home value. By comparison, Riverside County has begun imposing a Transportation Uniform Mitigation Fee (TUMF) in all City and unincorporated areas that amounts to $6,650 per unit or 2.7 percent of the estimated average new home value in 2002 ($247,300 per unit on average). The impact fee, while deemed onerous by many private sector developers, is not expected to impede near-term development activity. Although, the high desert housing market is relatively price sensitive, the potential cost burden implicit to an undetermined number of parcels does not represent a material detriment to housing development based on the average home values and subdivision densities identified.

Within the communities of Barstow and 29 Palms (representing around 2.7 percent of future West Mojave housing growth), the use of clustered subdivision layout designs that yield effective gross densities characteristic of the West Mojave area overall (4.06 units per acre) are recommended to substantially reduce the potential cost burden identified for an undetermined number of parcels. Based on these density design modifications, the maximum potential cost burden could be reduced to less than 0.25 percent of the average home value in these local markets.

Table 4-39. Private Land Permitting Costs – High Range Estimate for Typical 10-Acre Residential Parcel

WEMO Location	Gross Subdiv. Density	Total DUs	2002 Avg SFD Value	CESA/FESA Existing Conditions		WEMO Habitat Conservation Plan - Alternative A							
						Survey Area				No Survey Area			
				DWMA		1:1 Area		1/2:1 Area		1:1 Area		1/2:1 Area	
		*Total permitting cost for10-acre parcel:		$90,545		$42,750		$10,700		$6,850		$7,700		$3,850	
WEMO Cities	(DU's/AC)			($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value
29 Palms	2.09	83.6	$112,900	4,332	3.8%	n.a.	n.a.	512	0.5%	328	0.3%	n.a.	n.a.	184	0.2%
Adelanto	4.41	176.4	$91,100	2,053	2.3%	n.a.	n.a.	243	0.3%	155	0.2%	175	0.2%	87	0.1%
Apple Valley	2.09	83.6	$189,800	4,332	2.3%	n.a.	n.a.	512	0.3%	n.a.	n.a.	n.a.	n.a.	184	0.1%
Barstow	0.99	39.6	$139,500	9,146	6.6%	n.a.	n.a.	1,081	0.8%	692	0.5%	778	0.6%	389	0.3%
California City	3.48	139.2	$164,600	2,602	1.6%	1,228	0.7%	307	0.2%	197	0.1%	n.a.	n.a.	111	0.1%
Hesperia	4.41	176.4	$203,000	2,053	1.0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	175	0.1%	87	0.0%
Lancaster	3.77	150.8	$211,800	2,402	1.1%	n.a.	n.a.	284	0.1%	n.a.	n.a.	204	0.1%	102	0.0%
Palmdale	4.73	189.2	$242,500	1,914	0.8%	n.a.	n.a.	226	0.1%	n.a.	n.a.	163	0.1%	81	0.0%
Ridgecrest	4.18	167.2	$161,000	2,166	1.3%	n.a.	n.a.	256	0.2%	n.a.	n.a.	184	0.1%	92	0.1%
Victorville	5.32	212.8	$232,500	1,702	0.7%	n.a.	n.a.	201	0.1%	129	0.1%	145	0.1%	72	0.0%
Yucca Valley	2.09	83.6	$153,300	4,332	2.8%	n.a.	n.a.	512	0.3%	328	0.2%	n.a.	n.a.	184	0.1%
Unincorporated County Subareas															
San Bernardino	3.04	121.6	$202,500	2,978	1.5%	1,406	0.7%	352	0.2%	225	0.1%	253	0.1%	127	0.1%
Los Angeles	3.48	139.2	$231,800	2,602	1.1%	1,228	0.5%	307	0.1%	197	0.1%	221	0.1%	111	0.0%
Kern	2.09	83.6	$163,400	4,332	2.7%	2,045	1.3%	512	0.3%	328	0.2%	368	0.2%	184	0.1%
Inyo	0.99	39.6	$91,100	9,146	10.0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	778	0.9%	389	0.4%

* Total permitting cost for 10-acre parcel based on average HCA private land value of $770/acre.

Source: WEMO Biologists, U.S. Bureau of Census - Residential Construction Branch; Alfred Gobar Associates.

4.2.3.1.2 Fiscal Revenue

The most probable fiscal effect associated with the HCP program includes the potential loss of property tax revenue that would otherwise be received by West Mojave Cities and Counties. BLM would act as the lead agent for the property acquisition program, thereby removing private property from local tax roles. The level of impact is dependent on the amount, value, and geographic distribution of private property in the HCA that crosses city and county jurisdictions of the planning area. Property tax revenue losses associated with property acquisition would, however, be offset in part through payments in-lieu of tax (PILT) received from the Federal Government. Whether or not PILT effectively mitigates any identified significant impact can be reasonably assessed by reviewing precedent levels of payment to local agencies. A detailed discussion of the property tax structure for each City and County agency in the West Mojave and PILT is included in Appendix N.

The planning area encompasses about 9.36 million acres, of which the majority (6.46 million acres) includes government-owned lands already exempt from the payment of property taxes. The proposed HCA's of the West Mojave will encompass about 2.54 million acres, of which the majority (1.97 million acres) includes government-owned land (BLM, USFS, Military, County/City, etc.) already exempt from property taxes. Overall, there is approximately 2.9 million acres of private property throughout the West Mojave, of which approximately 575,000 acres, or roughly 20.0 percent, will be included within the proposed HCA's and considered for acquisition during the 30-year life of the program. Many private properties in the HCA's are already developed and, as result, are exempt from the land acquisition component of the HCP program. These improved properties represent an undetermined reduction in the total amount and value of private property that would effectively be removed from the tax rolls of affected jurisdictions.

Under the HCP program only vacant private property will be targeted for acquisition. The potential loss to the tax roll, therefore, does not include existing improved properties with higher values. Actual potential revenue loss depends on the underlying tax rate defining the amount of property tax that a given City or Count agency would receive per $1.00 of property tax generated and the absolute amount of land within a given jurisdiction that falls within the HCA.. The HCA boundaries under Alternative A are almost exclusively limited to unincorporated locations and do not include any portion of the eleven West Mojave cities with the exception of the City of California City. BLM mapping details suggest that roughly 15.0 percent of the total land area within California City, or 19,000 acres of largely vacant land along the City's northern border, would be included in an HCA designation.

The maximum probable loss of tax roll value and property tax to each affected agency is summarized in Table 4-40. As shown, the maximum amount of property tax revenue that would be eliminated if all private land in the HCA's were removed from the tax rolls equates to approximately $940,000 per year. As a share of property tax revenue corresponding to 2002 assessed values, the indicated impact would not adversely impact the fiscal revenue structure of the affected agencies.

Table 4-40
Estimate of Maximum Theoretical Loss of Tax Value and Property Tax in West Mojave Habitat Conservation Program

Geographic Reference	Private Land in HCA's (Acres)	Avg. Value Per Acre	Effective Tax Rate	Maximum Theoretical Loss 2002 Tax Roll ($000)	Maximum Theoretical Loss Property Tax[1]	Share of FY2002-03 Tax Revenue	FY2002-03 Total Property Tax Revenue
WEMO Cities							(City Limits)
California City	19,000	$370[2]	0.00274	$7,030	$19,228	2.27%	$846,000
Other WEMO Cities	Neg'l	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Unincorporated Areas							(Unincorp. Areas)
San Bernardino County	401,000	$489	0.00114	$196,089	$223,541	1.15%	$19,503,138
Los Angeles County	77,800	2,587	0.00296	201,269	595,885	0.39%	152,680,759
Kern County	76,700	650	0.00204	49,855	101,455	0.18%	56,977,850
Inyo County	n.a.	n.a.	0.00292	n.a.	n.a.	n.a.	n.a.
WEMO Overall	574,500			$454,243	$940,109	0.41%	$230,007,747

Note:

[1] Identified loss is gross annual theoretical loss possible if all private lands vacant and does not account for offsetting revenue to be received from PILT.

[2] Identified average value based on specific review of Assessor Map Books corresponding to localized area proposed for HCA designation.

Source: County Assessor Records; Alfred Gobar Associates

The indicated impact reflects a worst-case scenario since PILT reimbursement is not included as an offsetting form of revenue. Corresponding mitigation potential associated with future offsetting PILT is summarized by Table 4-41.

Table 4-41
Pilt Offset Of Maximum Potential Property Tax Revenue Loss

Affected Agency	Private Land in HCA's (Acres)	Est. Future PILT Payment Per Acre (FY 2003 amounts)	Annual Offsetting PILT Revenue	Net Effective Property Tax Revenue Loss	Revenue Loss As Share of 2002 Revenue
California City	19,000	$0.00	$0	unk	100%
San Bernardino County	401,000	0.20	0	$223,541	100%
Los Angeles County	77,800	1.04	$80,912	$515,003	0.35%
Kern County	76,700	1.20	$92,040	$31,658	0.06%
WEMO Overall	574,500	$0.37	$ 172,952	$	0.34%

Source: County Assessor Records; Bureau of Land Management; Alfred Gobar Associates.

Future PILT revenue can be expected to reduce potential property tax revenue loss by approximately $ 173,000 per year. PILT provides an established, while not guaranteed, source of Federal revenue that further minimizes the fiscal impact of the proposed land acquisition aspects of the HCP program in some jurisdictions. (Current appropriated levels are about 2/3 of the authorization. That amount is level for FY 2004, and will likely continue for FY 2005 and beyond.) (Note, only counties receive PILT payments. Cities do not receive payments for entitlement acreage lying within their boundary.) However, for San Bernardino County, the population (50,000) and acreage (1,337,129) maximums that cap the amount of federal reimbursement through PILT formulas have been met due to the large amounts of federal ownership that currently exists within the County. Therefore, any future property tax loss in San Bernardino County will not be made up with PILT under the existing formula established by federal law.

4.2.3.2 Employment & Income

The HCP program is expected to influence a wide range of economic activity throughout the planning area, most notably urban development, grazing activities, resource development, and recreation. To the extent the effects of the HCP program have been identified, corresponding implications for area employment and income also merit consideration. The California EDD estimates current 2002 local employment (jobs) throughout the planning area at approximately 232,500 jobs. The maximum theoretical effect on current employment associated with selected activities affected by the HCP program is discussed below as well as the probable direct effect of identified environmental impacts.

Urban Development: Building construction throughout the West Mojave most directly affects construction trades, engineering services, selected elements of the transportation and utilities sector, limited retail trades, and local government services related to site construction. On a combined basis, these selected job sectors represent about 9.3 percent of the current employment base throughout the West Mojave or roughly 21,600 jobs. The estimated composition of employment sectors influenced by urban development is summarized by Table 4-42.

Table 4-42
West Mojave Employment Influenced By Urban Development

Employment Sector	Share of WEMO Employment	Share of Sector Employment
Construction	3.87%	100%
Transp./Utilities	2.01%	42%
Retail Trades	1.34%	6%
Services	1.24%	4%
Government	0.85%	5%
Total	9.31%	

Employment within each of these sectors is largely driven by the overall level of urbanization throughout the West Mojave with the exception of construction, which responds most directly to real estate development pressure. As result, the maximum possible direct impact of the HCP program on urban development employment is substantially less than indicated, most likely not exceeding 5.0 percent of the West Mojave employment base. This level of theoretical effect describes direct employment losses that would result if future construction of all urban infrastructure, commercial buildings, and homes were to cease entirely, a highly unlikely scenario.

The HCP program is expected to have a negligible impact on the rate and location future urban development throughout the planning area, particularly for nonresidential development such as retail, office, industrial, and institutional. The projected level of housing development throughout the West Mojave is expected to generate approximately 9,175 housing construction jobs providing about $33,620 in annual income per worker. Potential limitations on housing growth inherent to the HCA designations and environmental permitting fees of the HCP program are considered negligible because the areas with highest probable impact are in remote locations where the majority of housing will consist of individual residences built on existing lots.

Grazing Activity: Most grazing production (cattle, sheep, etc.) is exported for additional grazing or processing outside the West Mojave region. Consequently, the area employment base most directly affected by grazing is limited to the agricultural sector, accounting for less than 0.9 percent of planning area employment, or roughly 2,000 jobs. Grazing activity has a long history throughout the planning area but represents a declining component of economic activity, both in absolute and relative terms. The bulk of agricultural employment includes agricultural service jobs (roughly 1,400), as distinct from stock production (less than 250 jobs) most directly associated with grazing activities. The bulk of agricultural service jobs are commonly geared to the support of crop production. Theoretically, the maximum direct impact associated with the

HCP program is defined by the proportionate share of agricultural sector employment directed to stock production. This maximum theoretical impact exceeds the probable worst-case effect associated with the HCP program because BLM grazing leases will be recognized until such time as voluntarily relinquished by area ranchers.

In the event an allotment was relinquished, BLM could incur a slight increase in management costs. These costs would be higher if range improvements were retained rather than removed. Existing ranger patrols would continue in these areas but would lack the assistance provided by private citizens working on BLM lands.

Resource Development: Due to the richness and diversity of mineral deposits throughout the planning area, resource development includes a wide range of related mining and extraction activities. Mining and natural resource extraction describes the area employment base most likely to be affected under Alternative A. Mining activity has a long history throughout the planning area but represents a static if not declining component of employment activity, both in absolute and relative terms. Current BLM records suggest this sector accounts for approximately 1.2 percent of the West Mojave employment base, or roughly 2,700 jobs. By contrast, EDD-based simulations suggest a significantly lower level of direct employment. The current base of mining employment describes the maximum conceivable economic impact that could possibly result from the removal of lands currently used for resources extraction, milling, and on-site production.

HCP program policies under Alternative A do not limit active operations at existing claims, which account for the current base of sector employment identified by BLM records. Most of the active operations discussed separately are not expected to exhaust remaining on-site resource capacity or represent the only verified deposits for a particular resource in the planning area. The proposed HCA designations, however, are likely to have a material but unknown effect on the long-term potential for future extraction and production of mineral resources not yet identified or quantified within the planning area. HCP regulations will require the development of future resources in designated HCA's to comply with the 1.0 percent AGD limitation and conform with best management practices for the protection of threatened and endangered species. Such limitations do not effectively preclude future operations but are likely to add to the cost structure defining current operations. In a number of undetermined circumstances, the HCP regulations are likely to render the development of future sites with yet unknown potential financially infeasible.

Recreation: Fundamental aspects of the West Mojave recreation experience influence the potential effect on area employment. Documented recreation activities throughout the West Mojave encompass a highly diverse range of activities, but most commonly evolve around the use of motor vehicles as a focal or ancillary element of the visitor experience. Beyond the mobility component of the experience, described recreation activities tend to emphasize immersion in the area's natural bounty (solitude, expansive vistas, wildlife, terrain, minerals, etc.) as opposed to manmade attractions and conveniences (theme parks, outlet centers, vacation resorts, convention centers, etc.). Also, Southern California describes the geographic origin for

the vast majority of recreation visitors to the West Mojave. These factors affect the duration and nature of recreation visits to the West Mojave and also employment sectors most likely to be influenced by the recreational pursuits of day-trippers and overnight visitors.

Sectors most directly influenced by described recreation activities include: selected transportation services; retail activities involving the sale of food, provisions, gas, and meals; specialized services such as lodging, vehicle repair, and recreation; and directed government services (park rangers, sheriff, etc.). On a combined basis, these employment sectors represent about 18.0 percent of the current job base in the planning area or roughly 41,800 jobs. The estimated composition of employment influenced by recreation activity is summarized in Table 4-43.

Table 4-43
West Mojave Employment Influenced By Recreation

Employment Sector	Share of WEMO Employment	Share of Sector Employment
Transp./Utilities	0.36%	8%
Retail Trades	12.28%	57%
Services	4.51%	13%
Government	0.85%	5%
Total	18.00%	

Overall employment identified for each of the above sectors is primarily driven by current urbanization throughout the West Mojave, not recreation visitors.

Recreation visits are expected to augment identified employment levels but not necessarily drive a significant share of jobs identified. As an example, OHV usage throughout the West Mojave is broadly estimated to attract roughly 2.0 million visitors per year. This level of trip-volume is consistent with annual shopper-trips describing a busy neighborhood shopping center (i.e.: 120,000-square-foot center supporting roughly 200 retail jobs). Most OHV visitors, however, are part of a larger group, which significantly reduces realistic shopper-trip potential associated with OHV recreation, particularly for non-dining retail expenditures. In addition, a substantial portion of OHV trip-related expenditures are made within the hometown location of recreation visitors who primarily drive up from the Metropolitan Areas of Southern California. Consequently, non-dining retail expenditures are not likely to support more than 50 retail sector jobs providing $30,360 in annual income per worker, on average. A greater portion of OHV visitors can be expected to make dining-related expenditures during a given visit. A 60.0 percent incident rate describing the purchase of a hot or cold meal while within the West Mojave (aggressive) suggests equivalent economic support for roughly 140 restaurant jobs providing an average of $14,960 in annual income per worker, on average.

On a combined basis, the above levels of retail support describing OHV visitor expenditures represent roughly 190 jobs or about 0.8 percent of food store and dining retail sector jobs that currently exist throughout the West Mojave. The magnitude of effect used to describe the influence of outdoor recreation activity on the retail sector of the West Mojave tends to characterize the level of effect for other employment sectors identified. Reported recreation

visitor activity in the planning area generates a notable but supplemental level of economic support for the current employment base of the region. The maximum possible effect of recreation activity on West Mojave employment and income, therefore, is substantially less than the above levels of employment describing those sectors influenced by recreation activity.

4.2.3.3 Livestock Grazing

4.2.3.3.1 Regional Public Land Health Standards and Guidelines for Grazing Management

The implementation of regional public land health standards and guidelines for grazing management are consistent with the recovery and conservation strategies contained in Alternative A. They contain changes in wording and the guidelines are more specific to this region, but do not differ significantly from the fallback standards and guidelines. There are no anticipated, additional impacts on existing livestock operations that would result from implementation of these measures, except the reduction in the utilization thresholds (see discussion below). The regional standards and guidelines would have to be incorporated into the grazing leases and permits for all allotments in the planning area.

There is a provision under regional guidelines for grazing management that would affect all cattle allotments on public land within the planning area: a reduction in the maximum percent utilization allowed for the current years' forage production. At present, forage utilization is managed with the use of Proper Use Factors (PUF's) of the individual forage species. PUF's may be as high as 50% or as low as 5%, depending on the plant species tolerance to grazing. Perennial bunch grasses have PUF's of 40% or 50%. Utilization within desert tortoise habitat but outside of tortoise critical habitat has been limited to maximum utilization thresholds of 40% and 50%. Under Alternative A, if an allotment that meets the regional public land health standards is grazed during the growing season the maximum utilization that may occur is 25%. This stipulation could cut stocking rates in half, and result in downward adjustments to the permitted use on some allotments. Although this management action may be warranted in poor and fair condition allotments and/or allotments not achieving the regional public land health standards, the implementation of this action on good and excellent condition allotments that are achieving the regional public land health standards may unfairly impact operations that have demonstrated good stewardship, and have little to no benefit in the recovery or conservation of covered species.

4.2.3.3.2 Cattle Grazing Outside Tortoise and MGS Habitat

Under Alternative A, allotments would be subject to rangeland health assessments within three years of plan adoption. Allotment assessments are already scheduled to occur, but due to their low priority the assessment would probably have taken longer than three years to complete. The proposed requirement to make a determination if regional standards are or are not being achieved within six months of the completion of the assessment does not differ from the existing public land health assessment process.

4.2.3.3.3 Cattle Grazing Within Tortoise Habitat and MGS Conservation Area

Management Under Existing Biological Opinions: A potentially detrimental impact on livestock operations arises from the BLM's need to comply with the non-discretionary terms and conditions of the June 2002 CDCA Plan biological opinion issued by the USFWS. One of these terms and conditions require that all of the terms and conditions of the 1994 biological opinion (1-8-94-F-17) be fully implemented. If not, livestock grazing "shall" be suspended and livestock removed from the affected areas until the allotment is in full compliance. This term and condition also states that BLM must bring the allotment into legal compliance within one month. The potential affect on any given cattle operation would vary depending on which term and condition a lessee or permittee is not in compliance with, the size of the area affected, the location of key range improvements, current stocking rates, and current forage conditions.

Another impact is the requirement that if an allotment is not achieving public land health standards in tortoise habitat, livestock grazing shall be removed from the affected area of that allotment until the standard is achieved. This requirement may be difficult to implement because, for example, if a plant community on any given allotment is not currently achieving the "Native Species" standard, it may take years or even decades of rest from grazing before that standard can be achieved (if ever). There would be enforcement challenges and additional budgetary burdens for BLM. The potential impacts on a cattle operation would depend on the size of the area affected, the location of key range improvements, current stocking rates, and current forage conditions. Presently the Walker Pass Common, Rudnick Common, Ord Mountain, Harper Lake, Cady Mountain, and Rattlesnake Canyon, allotments are not achieving public health standards in habitat for the desert tortoise. Rangeland health assessments have not been completed for the Lacey-Cactus-McCloud, Olancha Common, Tunawee Common, and Hansen Common, allotments. These non-discretionary terms and conditions are currently in effect and are not subject to plan approval.

New Management Prescriptions: Under Alternative A there would be five protective measures that would affect eight cattle allotments. None of these proposed management actions would have a major impact on the existing livestock operations.

The modification of the Lacey-Cactus-McCloud allotment boundary to exclude those portions of the allotment located within the boundaries of the China Lake Naval Air Weapons Station (NAWS) is a logical action because NAWS has cancelled livestock grazing within its boundaries.

The removal of cattle carcasses, and the elimination of hazards have been in effect on allotments within habitat for the desert tortoise since the issuance of the first Biological Opinion 1993 as terms and conditions.

Ephemeral use of cattle allotments would not be authorized until the production of 230 lbs/acre of ephemeral vegetation. This is a minor modification of the existing 200 lbs/acre requirement.

Only one action is truly "new": the requirement that all existing cattleguards in desert tortoise habitat be modified within three years after plan adoption to prevent entrapment of desert tortoises. This requirement would be costly to implement because the vast majority of the cattleguards installed on cattle allotments belong to BLM, so the necessary modifications would have to be made and paid for by BLM.

New management prescriptions would require BLM to prevent any further damage to identified riparian areas on all cattle allotments, including Round Mountain. BLM would also take an aggressive look at the best placement of new water developments (and established water developments that could be re-designed or re-located) to facilitate other management actions (e.g. establishment of exclusion zones) and minimize impacts on all covered species. These proposed management actions are necessary to ensure compliance with the proposed Regional Public Land Health Standard for Riparian/Wetland and Stream Function. This may result in the modification of existing cattle operations in the planning area. Due to funding limitations, the necessary modifications would have to be prioritized and scheduled over a four to six year period. These changes in grazing management actions are already being implemented on some allotments (such as Walker Pass).

Health Assessments: Under Alternative A, rangeland health assessments would be completed on these allotments within two years of plan adoption. This involves eight allotments administered by two BLM field offices. These allotment have already been scheduled for an assessment or re-assessment, but the requirement to have this task completed within two years after plan adoption would be difficult for BLM considering the implementation schedule of all the other management actions in Alternative A. The importance of doing, however, is high. Although the task would be difficult to achieve in these time frames, it is imperative that BLM determine if these allotments are achieving the proposed public land health standards as soon after plan adoption as possible.

4.2.3.3.4 Cattle Grazing Within DWMAs

New Management Prescriptions: Under Alternative A there would be potentially detrimental impacts on the Ord Mountain, Cronese Lake, Harper Lake, and Valley Well allotments. This is because cattle allotments partially or entirely within a DWMA would be subject to a requirement that a minimum ephemeral production of 230 lbs/acre exist if grazing is to continue within grazing exclusion areas between March 15 and June 15. If an allotment is entirely within a DWMA, and minimum ephemeral production is not attained, grazing operations on public lands would cease until ephemeral production meets or exceeds 230 lbs/acre or June 15, whichever is earlier.

This provision would have a substantially negative affect on the economic viability of cattle operations within DWMAs. These grazing operations depend greatly on the use of public rangelands to sustain their base herds. Most of the grazing lessees do not own or control enough private lands to support their base herd for 90 days without having to feed hay to their animals. As cited into EA-610-01-02 (Table 5), it is estimated that it would cost a grazing lessee anywhere

between $18,000 and $20,000 to buy enough hay to feed a base herd of 100 cows for three months on their private land. One dry year could render economic disaster to a rancher in this example. Other alternatives, such as renting private pasture, would be almost as costly if even available. Two consecutive dry years would effectively put most of the affected grazing lessees out of the cattle business.

In addition, ephemeral authorizations would be eliminated. As a result, the Pilot Knob Allotment would no longer be available for cattle grazing. There would the elimination of temporary non-renewable (TNR) authorizations below 4,500 feet. These two provisions further reduce the grazing management options previous granted grazing lessees.

The other eight cattle allotments in the planning area would not be affected by these proposed management actions.

Health Assessments: Under Alternative A, rangeland health assessments would be completed on these allotments within one year of plan adoption. This involves three allotments in one field office. These allotment are already scheduled for an assessment or re-assessment, but the requirement to have this task completed within one year after plan adoption would be difficult for BLM considering the implementation schedule of all the other management actions in Alternative A. It is imperative, however, that BLM determine if these allotments are achieving the proposed public land health standards as soon after plan adoption as possible, so creative approaches to completing this requirement would have to be developed.

4.2.3.3.5 Sheep Grazing in All Allotments

Management Under Existing Biological Opinions: Ephemeral sheep grazing in desert tortoise habitat has been managed under the terms and conditions issued in biological opinions since 1991. An extension of the 1994 biological opinion issued in May 17, 1999 reiterates the same terms and conditions contained in the 1994 biological opinion. The June 2002 biological opinion on the CDCA Plan requires the BLM to implement terms and conditions identified in previous opinions. This biological opinion also contains a term and condition related to public land health standards, requiring that rangeland health assessments for sheep allotments occur within four years of plan adoption. This term and condition would apply after these assessments are completed.

New Management Prescriptions: Under Alternative A, there would be very little change from the existing situation. The requirement that 230 lbs/acre of ephemeral forage production occur before ephemeral sheep grazing can be authorized is only slightly higher than the existing requirement of 200 lbs/acre. This should have little or no effect on sheep producers, who do not incur the expense of shipping their sheep from Bakersfield to the desert unless there is at least 350 to 400 lbs/acre of ephemeral forage awaiting them.

The requirement to remove and dispose of sheep carcasses is also an existing requirement.

This alternative would modify the maximum number of sheep in a band from 1,000 to 1,600. This provision takes into account the shipping of lambs and the combining of ewes from other bands, which makes sense for a larger band size to exist when this situation occurs.

Health Assessments: Under Alternative A, health assessments would be required within four years of plan adoption. This provision would delay BLM's ability to determine if regional public land health standards are being achieved or not achieved. In the Barstow Field Office, all the existing sheep operations occur on allotments within OHV Open Areas. If a determination is made that a standard is not being achieved, the determination must also decide if ephemeral sheep grazing is the primary cause. This may lead to changes in the management of whatever is the primary cause of the failure to achieve a standard.

4.2.3.3.6 Sheep Grazing In MGS and Mojave Monkeyflower Conservation Areas

Under Alternative A., ephemeral sheep grazing would cease in the MGS Conservation Area when ephemeral forage is no longer available and sheep make a dietary change to perennial shrubs. More specifically, there would be a utilization threshold of key shrub species (see Table 2-19) important to Mohave Ground Squirrels that would trigger sheep removal. This approach makes sense, and is compatible with the recovery and conservation goals of Alternative A

Ephemeral sheep grazing would be discontinued in the portion of the Mohave Monkeyflower Conservation Area that overlaps the Middle Stoddard Mountain Allotment. This management action would eliminate the potential for most future grazing in this portion of the allotment. Due to a large land exchange in the late 1990's, most of the remaining public land in this use area occurs within the proposed conservation area. Due its rocky nature, very little sheep grazing has historically occurred here, so impacts on the ephemeral sheep operation on the Stoddard Mountain Allotment would be nominal.

4.2.3.3.7 Sheep Grazing in DWMAs

Under Alternative A, there would be a potentially detrimental impact to grazing operations on the Buckhorn Canyon, Gravel Hills, Superior Valley, Goldstone, Lava Mountain, and a portion of the Cantil Common allotments.

The Goldstone, Superior Valley, Gravel Hills, and Buckhorn Canyon Allotments would no longer be available for sheep grazing. These four allotments are either partially or entirely within a DWMA. There would, however, be no "real" impacts on these sheep operations because the allotments have not been grazed since the late 1980s, and have not been authorized for ephemeral sheep use since 1991. Biological opinions issued in 1991 and 1994, addressing ephemeral sheep use on public land in Category I and II habitat and critical habitat for the desert tortoise, disallowed ephemeral sheep grazing on these allotments.

Although the Lava Mountain Allotment is neither partially nor entirely located in the Fremont-Kramer DWMA, the Fremont-Kramer DWMA boundary blocks all historically used

access roads outside the allotment. The allotment is entirely within the Golden Valley Wilderness, which at the current time does not allow motorized access. Unless authorization to use motorized vehicles is given to the sheep operator it is unlikely that grazing would continue on the allotment.

The Fremont-Kramer DWMA is larger than the desert tortoise critical habitat boundary and would eliminate more grazing in the Cantil Common Allotment than was mandated in the past biological opinions. At least one entire use area for an operator would be eliminated in the southern part of the DWMA below Atolia.

The Goldstone Allotment is currently vacant, and entirely within lands transferred by Congress to Fort Irwin in 2001. Under Alternative A the vast majority of the Buckhorn Canyon Allotment would be within a DWMA where ephemeral sheep would not be allowed on public land. The Gravel Hills and Superior Valley allotments, however, are not vacant. The permanent discontinuation of ephemeral sheep grazing on these two allotments would have a negative impact on the lessees.

There would be an additional loss to ephemeral sheep grazing of approximately 6,700 acres of public and private land in the Shadow Mountain Allotment. The proposed Fremont-Kramer DWMA would extend farther south than the current critical habitat boundaries. This moderate disruption to current operations would compel any future sheep grazing to operate within the fenced boundary of the El Mirage Cooperative Management Area. Although this is allowed under the management plan for El Mirage, potential conflicts between sheep grazing and OHV use would increase as a result of this action.

There would be a permanent discontinuation of ephemeral sheep grazing on 99,327 acres of both private and public land in the West Unit of the Stoddard Mountain Allotment. Because sheep grazing has been prohibited in Category I and II tortoise habitat since a 1991 biological opinion, this unit of the allotment has not been authorized for ephemeral sheep grazing in over ten years. Consequently, there would be no real impact to the grazing operation.

There would be a new loss of approximately 11,000 acres of public land in the Middle Unit of the Stoddard Mountain Allotment, which would be unavailable for ephemeral sheep grazing. Sheep grazing would be prohibited in the Mohave Monkeyflower Conservation Area.

There would be no substantive affect to ephemeral grazing operations on the East Unit of the Stoddard Mountain Allotment being outside of a DWMA.

4.2.3.3.8 Voluntary Relinquishment of Grazing Allotments

Voluntary relinquishment of a grazing permit or lease is consistent with the recovery and conservation strategy of Alternative A. This action, however, substantially limits any opportunity for the livestock industry to expand. Once an allotment is relinquished the opportunity for another permittee or lessee or other qualified applicant to apply for the use of that

allotment, or the attached permitted use, would be eliminated. In fact, voluntary relinquishment would further reduce this long-standing industry.

4.2.3.4 Mineral Development

This section discusses the effects of implementation of Alternative A on the development of the mineral resources of the western Mojave Desert. It is organized into three parts: (1) a general discussion of specific components of the conservation strategy, such as the implications of standardized best management practices, proposed withdrawals and certain species-specific measures; (2) the effect on regional mineral development; and (3) the effect on mineral development of the designation of several of the conservation areas.

4.2.3.4.1 General Discussion

Best Management Practices: Adoption of standardized "best management practices" in tortoise habitat requires that the field contact representative be an authorized biologist. This would result in an added cost to hire this person to be on site at all times during the construction phase of the project (including fence construction) rather than only when tortoise handling would be required. This cost would be more than compensated for by the significant savings of time in not having to obtain "authorized biologist" status for a particular project, as is the current practice. In other words, a biologist could be authorized for a multitude of projects instead of being re-authorized for every project.

Allowable Ground Disturbance Threshold: As indicated previously, a one percent allowable ground disturbance (AGD) applies for new ground disturbance in the habitat conservation area. It is anticipated that the one percent AGD for habitat conservation areas would not be reached as a result of mining disturbances during the 30-year term of the West Mojave Plan because it only applies to mining activities that are permitted or approved following adoption of the West Mojave Plan, and thus permitted or vested mining operations would not be subject to the one percent threshold.

Bat Conservation Measures: Regarding bat protection in the Pinto Mountains, a project proponent would be required to conduct surveys under both Alternative A and current management. Under Alternative A, abandoned mine openings in several mines would be gated to protect significant bat roosts. Unless covered by a current claim with valid existing rights, this would require alternate access to be constructed by miners wishing to enter the underground mines. The management prescriptions under Alternative 'A' specify take-avoidance measures for non-significant sites only. Take of significant roosts would be considered unnecessary and undue degradation and mining proposals that would disturb them would probably be denied. There are no known current mining claims encumbering abandoned mines containing the Pinto Mountain bat roosts. Mines in the area such as the Golden Rod and Moose mines are described in an unpublished volume compiled by a California Division of Mines and Geology employee (Gray, Jr., 1978?, p. 459 & 587).

Proposed Withdrawals: Withdrawals are proposed for three of the conservation areas. Most of these have moderate to high potential for mineral resources. The proposed withdrawals, aggregating about 50,000 acres, are tabulated below:

Conservation Area	Acres Proposed For Withdrawal
Afton Canyon ACEC	8,160
Lane Mountain Milkvetch	12,100
Rand Mountains	32,590
Bat Mine-Entrances	unspecified but small

On public lands and mineral interests reserved to the United States, mineral exploration, development and locating new mining claims would be prohibited where there are mineral withdrawals.

Conservation areas requiring withdrawals and validity exams would result in an administrative burden on the BLM. The delay resulting from a validity exam is estimated to be two to three years for the examination, report review, scheduling of a hearing, and processing appeals. The cost, ultimately passed on to taxpayers, is estimated to be $25,000 per exam. Further, these withdrawals would eliminate future prospecting and exploration and deny future mineral extraction in some of the country's most mineralized areas. With the exception of Afton Canyon, all of the areas proposed for withdrawal or validity exams contain zones of moderate or high potential for the occurrence of mineral resources.

Potential economic benefits of possible future production may also be foregone. In addition, acquisition of private lands for reserve or conservation areas by government agencies Alternative A would place restrictions and costs on future exploration and development to some degree, thereby resulting in lowering mineral resource availability.

When the U.S. Bureau of Mines conducted their mineral resource assessment in 1992 and 1993, an impacts analysis with deposits forgone for the Rand Mountains-Fremont Valley Management Plan, the only part of the West Mojave Management Area being proposed for withdrawal at that time, they found that $227 million in mine revenues, $131 million in personal earnings, and 408 construction-related and 372 production-related jobs may be foregone in addition to one future open-pit heap-leach gold.

Tax Base Effects: Acquisition of private inholdings in most of the proposed conservation areas such as carbonate endemic plants, Brisbane Valley, and the Lane Mountain milkvetch ACEC, would not result in a loss of tax base because mineral development would already be precluded by BLM's management prescriptions in the area of the species being protected. Acquisition of private inholdings in the Pisgah Crater ACEC, however, would likely result in loss of tax base to the counties. The loss of tax base from the sand and gravel deposit in the Big Rock Wash Conservation Area would not be a factor within the 30-year term of the West Mojave Plan as adequate resources outside the conservation area that could meet local market needs have been identified through the year 2046.

4.2.3.4.2 Regional Mineral Development

Overview: Most existing resources being developed currently within the CDCA would be depleted within the 30-year term of the West Mojave Plan. During this period, most operators would be seeking additional resources to meet market needs and assure the continuation of their operations in the area. Most of these deposits are expected to be smaller, lower graded, and further from existing plant facilities and market areas. By the mid-2030's, mineral producers and developers would be planning to develop these deposits, which generally would be less desirable than what is currently being mined. For example, U.S. Borax would probably be developing smaller or lower graded deposits such as the Rho, Hill 395 (Fremont-Kramer DWMA), and possibly the Columbia Gem (Ord-Rodman DWMA). It isn't known if the company would choose in situ mining and leaching or some other method for recovery.

Likewise, the limestone/cement industry would be planning new quarries, but because there is a greater occurrence of deposits in the desert region, the choice of a particular deposit 30 to 40 years from now is difficult to predict. Because of the cost and permitting obstacles in constructing a new mill and cement plant, the focus would be on deposits within haul distance of existing plants, using high capacity, non-highway conveyance systems. As such, most carbonate resources in and around the Lucerne Valley and Victorville areas, as well as the San Bernardino National Forest would be favorite targets by these companies.

Sand and Gravel Aggregates: By the late 2020's, aggregate shortages would probably occur in the Los Angeles and high desert market areas, and the restrictions and costs imposed by Alternative A for developing new sites would become noticeable. Depending on the location, the same mitigation costs would be part of the other alternatives as well. Nonetheless, the West Mojave Plan recognizes the importance of conserving important mineral resources throughout the planning area, particularly those sand and gravel resources that have been designated by the State of California as being regionally significant. It is intended that the plan would be implemented in a manner that is compatible with California's program of classification and designation of mineral resources, and the policies protecting and promoting the mining of these resources. The reduction in feasible alternative sites or mitigation costs imposed by the plan would hasten depletion of those deposits that could still be economically mined. This conclusion is based on the following information.

Among the sites that could be at or near depletion by the 2030's are the Service Rock aggregate deposit in Barstow and a number of small deposits along the highway west and north of Oro Grande and the Opah Ditch aggregate site southwest of Baker (Category III habitat).

In addition, depletion in coastal counties would put pressure on the desert region to furnish their aggregate requirements. Los Angeles, Orange and Ventura Counties produce and consume more construction aggregate than any other metropolitan area in the United States, more than 35 million tons in 1997 (Beeby et al., 1999). Forecasts regarding the rate of population growth, zoning ordinances, and resource depletion lead to the conclusion that alternative sites

must be found. For example, at the average rate of historic aggregate consumption in the Barstow-Victorville production district, including Lucerne Valley, the total reserves would theoretically become exhausted by 2027 (Miller, 1994, p. 8). A 1977 report for the aggregates in the Greater Los Angeles Area predicted that the last extremity of the producing aggregate deposits would be reached in 2005, when the upper Santa Clara River production district is meeting the entire demand load of 43.4 million tons (Evans, et al., 1977, p. h).

Some of the outlying deposits such as in the Palmdale production-consumption (P-C) region (Big Rock and Little Rock fans) are "nearly adequate" for supplying construction aggregate for the existing population of inhabitants and the anticipated population increase by the year 2032, using an average annual consumption rate of 12.2 tons per capita. The total projected estimate is 122 million tons that would be needed to meet the local demand for the Palmdale P-C region (Joseph et al., 1987, p. 39). The Little Rock Creek fan, in the Palmdale P-C region, is predicted to reach depletion by 2046, only about a decade after the term of the West Mojave Plan. Almost all current aggregate sites serving the Los Angeles metropolitan area would be depleted of reserves by about 2017 or less (Beeby et al., 1999).

The forecast for Orange County is critical with a 50-year demand estimate of 779 million tons, and known reserves of only 55 million tons (Falasco, 2001, p. 7). Should unforeseen events occur, such as massive urban renewal, disaster reconstruction, or major recession, the aggregate demand could change considerably. The presence of the San Andreas fault system within the Palmdale P-C region and its proximity to the Saugus-Newhall P-C region increases the chance for a damaging earthquake and subsequently the need for extensive amounts of aggregate for reconstruction (Joseph et al., 1987, p. 39).

Alternative sources of aggregate include opening hard rock quarries in places like Oro Grande and the Stoddard Open Area, developing more remote alluvial deposits such as the lower slopes of the San Bernardino Mountains and the Blackhawk Landslide in Lucerne Valley, rail hauling aggregate from Lytle Creek and Nevada, modification of boundaries of restricted areas such as the Soda Mountains wilderness study area, and dredging offshore deposits (Williamson, 1990, p. 1).

4.2.3.4.3 Mineral Development Within Specific Conservation Areas

The anticipated effects on mineral development within selected conservation areas having above-average mineral potential are described below.

Tortoise DWMAs: The four DWMAs combined include nearly 300,000 acres having moderate to high potential for the occurrence of mineral resources. In addition, there are over 900 mining claims and 20 mill site locations. Important borate deposits occur north of Kramer Junction in the Fremont-Kramer DWMA; however, the amount of acreage required for development is difficult to assess at this time. Existing mines in DWMAs, where the activity is not in occupied habitat, would be allowed to continue without compensation payments because

they qualify as grandfathered uses.

Mohave Ground Squirrel Conservation Area: The MGS Conservation Area includes about 1.2 million acres, of which 400,000 acres overlap the DWMAs. About 264,000 acres of the non-overlap area have high and moderate potential for the occurrence of mineral resources. In addition, the conservation area contains 680 mining claims and 40 mill site locations. Existing mines in HCAs would be allowed to continue without compensation payments (if in an area unoccupied by tortoises) because they qualify as grandfathered uses.

Big Rock Creek Conservation Area: About 2,400 acres of private land having high potential for sand and gravel (SMARA MRZ-2) are within the Big Rock Creek Conservation Area in Los Angeles County. This conservation area is bounded to the north by Highway 138 (Pearblossom Highway), and thus it will not interfere with existing or future mining operations to the north of Highway 138. Specific management is to allow sediment transport and the movement of large animals to continue. To meet this goal, 1) acquisition funds would be directed toward willing sellers of land within the Big Rock Creek Conservation Area, 2) Los Angeles County SEA boundaries would be expanded to include the Big Rock Creek Conservation Area, and 3) no structural flood-control improvements would be allowed south of Highway 138 that would impede sediment transport or wildlife movement. This would represent a resource loss estimated to be 1.2 billion tons including the main portion of the fan with sand and gravel that could be mined to a depth of 50 to 55 feet (Joseph et al., 1987, p. 20 & 21). This loss would probably not be noticed within the 30 year life of the West Mojave Plan because the forecasted depletion date for the nearby Little Rock Wash fan is not until 2046 (Beeby et al., 1999). However, this estimate does not take into consideration the importation of aggregate from Little Rock into the Los Angeles market to meet its market demand.

Big Rock Creek Conservation Corridor: Currently, there are lands located within the possible boundaries of the Big Rock Creek Conservation Corridor that are designated by the State of California as being "regionally significant" under SMARA. The goal of the Big Rock Creek Conservation Corridor is to facilitate wildlife movement between the Angeles National Forest and conservation areas located to the north. Though nothing in the West Mojave Plan precludes mining activities in the Big Rock Creek Conservation Corridor per se, mining activities may be curtailed or limited in order to facilitate natural drainage and sand flow through the corridor to the north. This potential limitation may result in a minor impact on mineral resources due to the presence of regionally significant sand and gravel deposits in this area.

Carbonate Endemic Plants Conservation Area: The proposed ACEC is located on the east side of Highway 18. Within the proposed ACEC are 257 acres having high potential and 4,416 acres having moderate potential for the occurrence of carbonate and aggregate mineral resources. In addition, there are known to be 41 mining claims within the proposed ACEC. It is anticipated that at least 4,393 acres would be placed within the highly restrictive ACEC. The proposed ACEC contains a zone in the Round Mountain area identified as having moderate potential for the occurrence of limestone and has had recent exploration interest from two companies. Under Alternative A, the area would be a reserve with stringent protective measures

that would discourage exploration and the opportunity to determine the extent of those mineral values. Experience has shown that even under current management, the required surveys cause the proponents to withdraw their plan of operations for exploration rather than incur survey costs when the outcome is uncertain.

Regarding the area west of Highway 18, due to the presence of populations of Parish's Daisy and other protected plants, a company that proposes expansion of a limestone mine or an aggregate pit would face a 3:1 compensation requirement in terms of "conservation units" (instead of land value) for take permits. Protected plants may be destroyed, although no loss of these plants may occur within any CHMS "administrative unit" until most of the valuable carbonate plant habitat in the CHMS's "Stage 1 Priority Areas" within such units has been added to the Habitat Reserve (Olson, 2002, p. 11). At present, by comparison, the proponent on private land would be limited to avoidance of plant populations rather than having the option of development by participating in a 3:1 compensation program. The CHMS is a voluntary program.

Impacts in the form of increased costs and placing some deposits off limits would occur in the carbonate management boundary (regardless of which plan alternative is chosen). Carbonate and aggregate operators currently have adequate resources outside the CHMS reserve area sufficient to supply the present market and the anticipated market throughout most of the 30-year term of the West Mojave Plan. This may not be true by the end of the plan's term. In the case of aggregate forecasts, it is anticipated that by the 2030's shortages would occur not only in the local community but also in other communities and counties that could be supplied by deposits in the Carbonate Plants Conservation Area.

Lane Mountain Milkvetch Conservation Area: The following discussion of the Lane Mountain milkvetch HCA is tentative, pending the designation of critical habitat by the USFWS. The proposed conservation area for the Lane Mountain milkvetch contains nearly 12,000 acres of moderate to high potential for gold. The proposed withdrawal of about 12,000 acres would preclude exploration and mining. Validity exams required for mining activity on 22 mining claims (about 1,000 acres) in the Lane Mountain milkvetch conservation area at Coolgardie Mesa would be costly. The withdrawal requirement, if coupled with a prohibition of recreational mining or collecting under 43 CFR 8365, would also mean a loss of enjoyment and income from the gold prospecting/recovery experience on the part of the club members who ordinarily operate where the withdrawal is proposed. If the claims were found to be invalid, the dry washing gold miners would be unable to continue their activity on claims within the Coolgardie Mesa portion of the Lane Mountain Milkvetch Conservation Area. Either that, or they would have to bunch up with other members on mining claims outside of the withdrawal. This would have a tendency to increase impacts on tortoise habitat west of the milkvetch ACEC. Because there is no provision for take or disturbance of milkvetch, any mining proposal on a portion of a perfected, valid claim within the HCA would result in a takings issue and buy out of the mining claim.

Even without a withdrawal and validity exams, the "no take" provision coupled with the difficulty for miners to identify the plant would lower the threshold level of surface disturbance

to more than "nominal", necessitating a plan of operations so that the current "casual use" level of activity of digging holes for dry-wash sluicing would probably require BLM authorization. If this were the case, it is anticipated that most plans of operations would be filed by the mining club owners because individual members would be reluctant to post a reclamation bond and pay for plant surveys and 5:1 compensation for lost habitat. If the withdrawal proposal were removed, "take" could probably be avoided only by an adaptive management strategy requiring new plant surveys in a limited area between the rectilinear conservation area boundary and the somewhat smaller polygon based on survey results. Actually, there are two such areas because of the donut-like shape of the milkvetch population. If this were the case (no withdrawal), new plant surveys would mean an additional cost and delay for claimants. A validity exam requirement, if maintained under an adaptive management strategy, would also cause a delay in processing a plan of operations.

Route designation would not affect mining activity in the Lane Mountain Milkvetch Conservation Area because those lands would be under a withdrawal that would exclude mining activity anyway. Proposed closure of routes such as SU 3022, -3028, -3035, -3045, -3046, -3058, -3061, and -3063 would discourage dry washing for gold on portions of about half a dozen mining claims west of the proposed HCA. Access to those areas would require a plan of operations and associated bonding for authorized access on those routes and other routes that are not designated or signed as open. The extent of the delay depends on the willingness of the current claimants to file a programmatic plan of operations. The requirement to restore routes to original condition would impose no additional cost because numerous routes already exist. For this reason, the impact from bonding reclamation would be minimal.

Mohave Monkeyflower Conservation Area: Alternative A proposes a 5:1 compensation for expansion in the conservation area for the Brisbane Valley population of the Mojave monkeylower. The compensation requirement would discourage mineral development in an area where there are 46 mining claims and over 7,000 acres having moderate to high potential for the occurrence of gold, and sericite and other types of clay. Because the operating cement quarries are in the "survey incentive" part of the Brisbane Valley conservation area, any expansion would require a survey and a minimum of 1:1 mitigation fee. The same would apply to any future aggregate development in this area. Three sites in this zone have been classified as MRZ-2b (high likelihood that economic concentrations of minerals are present) under SMARA (Miller, 1993, p. 38 & 39). The Oro Grande aggregate and Portland cement production areas border the proposed Brisbane Valley conservation area and are within the survey area requiring a compensation fee. The effect would be a slight increase in the cost of producing cement and aggregate.

North Edwards Conservation Area: It is anticipated that the proposed North Edwards Conservation Area would not adversely affect the periodic extraction of clay from the large stockpile on private land west of the town of Boron in Kern County. Management prescriptions call for an easement, which should not interfere with the clay operation. This conservation area contains 30 acres having moderate potential for the occurrence of industrial minerals. There are no mining claims within the HCA as it is mostly private land.

Pisgah Conservation Area: Cinders are being mined on a small scale, and it is presumed that hectorite and borate mining would continue for decades just outside the proposed Pisgah ACEC. Existing mining would be allowed to continue on the nearly 9,000 acres of high potential for the occurrence of mineral resources. This area contains nearly 300 mining claims and 85 mill site locations. The effect on new mining from the proposed ACEC is unknown because Alternative A is silent on restrictive prescriptions for this. Because of the time constraints for bidding on jobs, paving and aggregate contractors cannot risk waiting for the outcome of an environmental study and appeals procedures before a contract for material can be authorized.

Rand Mountains: As recommended in the Rand Mountains, Fremont Valley Management Plan (1993, p. 21), 32,590 acres in the Rand ACEC would be withdrawn from mineral entry. This area contains about 5,000 acres having moderate potential for vein or disseminated gold. The area also includes 3,200 acres of placer gold known as the Koehn placer, also known as the Cantil Valley placer (Dunn, 1992, p. 22-23). Neither the Rand ACEC nor the Fremont-Kramer tortoise DWMA includes the Sanford Stone mining operation.

Expansion of existing material sales sites would be allowed to continue, but new mining claims, exploration and mining would be prohibited. Although the final plan for the Rand-Fremont management area allows for much of the identified mineral resources to be developed, estimates show that an additional $227 million in mine revenues, $131 million in personal earnings, and 408 construction-related and 372 production-related jobs may be foregone (Dunn, 1992, p. 6). In 1992 the U.S. Bureau of Mines estimated that one future open-pit heap-leach gold operation beneath thin alluvial deposits would be lost (Dunn, p. 30). There are at least ten mining claims in the proposed expansion area, so the time and cost of conducting validity exams is an added impact. The northeast portion of the management area includes claims owned by Orange County 49ers, Inc. and the Valley Prospectors, Inc. (T.29 S., R.40 E., Sec. 28, SE1/4). The future of their operations depends on the outcome of future validity exams. The plan does not specify whether mining on valid claims would be allowed to continue of if the claims would be bought out.

4.2.3.4.4 Mineral Impacts: Conclusion

The advantage of Alternative A compared with current management is providing standard mitigation, such as incidental take permits, which would save time on private land. The elimination of surveys for the MGS would save time and money for many projects. Regarding the desert tortoise and Mohave ground squirrel, presence-absence surveys would be eliminated for areas outside of DWMAs. Clearance surveys would still be required for the tortoise except in areas where its presence is unlikely. Consultation, on a project-by-project basis would still be required. Existing mines in DWMAs, where the activity is not in occupied tortoise habitat, would be allowed to continue without compensation payments because they qualify as grandfathered uses. It is anticipated that the one percent AGD for habitat conservation areas would not be reached during the life of the West Mojave Plan.

4.2.3.5 Regional Recreation Opportunities

A substantial increase in demand for access and related services would occur primarily because of increased population growth in Southern California. Other factors include:

- An emerging awareness of desert resources and values
- Saturation of other outdoor recreation areas in Southern California
- Energy shortages and economic stresses that would cause more people to come to the relatively nearby desert and stay longer
- Technological innovation in recreational equipment that would influence user trends and consequently the demand for various resources

All of this suggests that the demand for access into the California Desert's public lands is on the increase, and that the need for the judicious designation of routes into these large areas is high.

Under Alternative A, the western Mojave Desert will continue to offer a variety of areas and types of routes that will meet the needs of recreational users. While some activities such as competitive OHV racing have been curtailed and moved to areas specifically designated for that purpose due to environmental reasons (e.g., Stoddard Valley and Ord Mountain open area), the regional recreational needs of the public were carefully taken into account as they were weighed against other resource concerns. As a result the proposed route network largely meets public recreational and commercial motorized access needs. The Table 4-44 reviews some of the effects of the proposed route network upon recreation opportunities within several of the more popular West Mojave subregions.

Table 4-44
Effects on Specific Types of Recreation

SUB REGION NAME	MOTORCYCLE	FOUR WHEEL DRIVE	EQUES-TRIAN	HUNTING	ROCK HOUNDING	HISTORIC EXPLOR-ATION	NOTES
Coyote	Moderate recreational opportunity for M/C. Greater closures in flat areas such as Coyote Lake	Moderate 4WD opportunity. Impacts on checker-board ownership low.	Staging opportunities continue to exists in spite of moderate closures.	Moderate bird hunting opportunities – closure is low impact	Moderate Rock hounding & mining - closure has low impact	Touring for interest in a few old mines, such as the Alvord Mines.	B to V started at Alvord Rd north of I-15 and continued east on utility easement.
El Mirage	Route closures in the flats will impact touring opportunity. Technical riding opportunity in mountains maintained.	High route closures in flats will have minimal impact. Technical routes maintained in Shadow Mountains. Larger OHV interest in El Mirage Dry Lake	Low Equestrian demand Potential equestrian opportunities maintained in Shadow Mtns	Low Hunting Demand Route closures will little impact to hunting opportunity.	No high level interest in rock hounding. Access routes in Shadow mountains remain for exploration.	No high level interest in historical exploration. Access routes in the Silver Peaks and Shadow mountains remain for exploration.	There is some recreation interest in area of Shadow Mts. and Rabbit Hole Mine
Fremont	Loss of touring opportunity in southern section	Loss of touring opportunity south of Harper Dry Lake.	No loss of technical opportunity; some loss of touring	No loss	Minimal loss in the mountains.	Minimal loss in the mountains.	Exploring through traveling of old routes such as Cuddeback - Fremont Road, Lockhart Road, and Harper Lake Road.

SUB REGION NAME	MOTORCYCLE	FOUR WHEEL DRIVE	EQUES-TRIAN	HUNTING	ROCK HOUNDING	HISTORIC EXPLOR-ATION	NOTES
Juniper	Popular MC opportunity due to relative proximity to the Apple Valley and Victorville. Leaves intact much of the viable route network with minimal impact.	Moderate to heavy level of route closures but viable route network left intact.	Equestrian access to San Bernardino National Forest through primary routes such as the Pack Trail and trails along Grapevine Canyon. Just north of the Pacific Crest Trail. Minimal impact on equestrians.	Moderate size of subregion does not offer a high level of hunting opportunities, however the proposed route network accommodates hunting.	Subregion does not offer a high level of rock hounding opportunity.	Allows trail access to early historic sites in San Bernardino Mountains relating to late 1800s and early 1900s time period.	Relatively small subregion located at the north base of the San Bernardino Mountains and on the north edge of the San Bernardino National Forest. Access still provided to most popular routes and staging areas.
Kramer	This is a moderate use sub region. High levels of closures have a moderate impact.	Moderate use sub region. High levels of closures have a moderate impact on 4WD recreation, travel on Kramer Rd, Buckhorn Wash and Iron Mtn Rd in east Kramer.	Low equestrian interest. High levels of closures have little impact. Opportunity maintained in Iron Mtns.	Low draw for hunting High level of closures will have little impact on opportunity.	Historic high interest in Kramer Hills. Access opportunity in that area maintained.	Low historical interest Hi closures Low impact	Activity level of this sub - occurs because of Proximity to Highways 395 & 58
Middle Knob	Moderate MC opportunity.	Significant interest in 4WD activity related to mining and maintaining facilities such as the Los Angeles Aqueduct.	Moderate level of 4WD routes offer access for equestrians; this access is maintained since there is a low amount of closure.	The existing 4WD network provides good access to the Middle Knob area for hunting.	There is a minimum of rock hounding interest in this area; trail network provides some opportunity.	Historic exploration can be enjoyed through visitation of old mines, such as the Amalia Mine and Skyline Mine.	There are recreation opportunities through traveling on maintenance routes to the Los Angeles Aqueduct.

SUB REGION NAME	MOTORCYCLE	FOUR WHEEL DRIVE	EQUES-TRIAN	HUNTING	ROCK HOUNDING	HISTORIC EXPLOR-ATION	NOTES
Newberry - Rodman	Relatively low demand for MC recreation; much of the central portion of the subregion is within Rodman Mtn and Newberry Mtn Wilderness.	Some 4WD opportunity, but relatively small network of routes.	Low level of equestrian recreational opportunity due to low number of appropriate trails.	Low level of hunting opportunity.	Relatively high interest in rock hounding, due to presence of several mines such as the Bell Mine, Silver Cliffs Mine, Camp Rock Mine, and the National Mine.	Good access off of Interstate 40 and Fort Cady Road to mining areas and primary 4WD routes for circulation, such as Troy Road and Fort Cady Road.	Network provides access to the Newberry Mountains and Rodman Mountains Wilderness, and also the Johnson Valley OHV Area to the south.
Red Mountain	Moderate to high recreational opportunity maintained by selective site-specific moderate closures, including "C" route offsets. Route closure plan will reduce recreation opportunity at Cuddeback Lake.	High 4WD interest will be moderately impacted by closures, including "C" route offsets. Route closure will reduce recreation opportunity at Cuddeback Lake.	Moderate equestrian opportunity. Moderate closures will lead to moderate impacts.	High interest. Moderate closures will impact opportunity moderately.	Very high levels of historic and present day mining activity. Moderate closures may result in only moderate impact due to minimal access needs being met by network.	Historic interest in mining. Opportunity maintained by selective closures.	Mountainous terrain in north offers interest in OHV activities, north of Twenty Mule Team Road and Cuddeback Lake. "C" route offset closures concentrated in this area.
Superior	Moderate recreation opportunity. Moderate to high route closure, especially in Lane Mtn Milk vetch CA. Moderate impact.	Moderate recreational opportunity. Moderate to high route closure, especially in Lane Mtn Milkvetch CA. Recreational impact generally low.	Moderate to high equestrian demand. Moderate to high closures done selectively; impact low.	Low to moderate hunting demand. Good route network, low recreational impact.	High rock hounding demand. Network maintained, little impact.	Moderate interest. Low impact to recreational opportunity.	Region has high tortoise numbers so many routes closed. Those routes retained still offer a complete network.

Recreationists who cannot participate in their desired activity in one location may seek an alternate site elsewhere. The result may be "spillover" into areas adjoining or nearby the location where the visitor originally went to recreate. This increases the chances of random travel, perhaps by using closed routes or new cross-country, in search of a new site. In order to minimize travel on closed routes or the creation of "volunteer routes", additional signs and other informative media can be used to direct recreationists to other locations, via designated routes, where the desired type of recreation exists. This would, however, increase workload demands on BLM staff to maintain signs along designated routes. Examples of this may occur in the Kramer sub region in the areas adjoining the community of Silver Lakes or in areas north of Barstow in the Superior sub region.

Competitive Events: With the exception of the Barstow to Vegas and Johnson Valley to Parker races, and the use of "C routes", all competitive timed speed events have occurred in the OHV open areas since the CDCA Plan was adopted in 1980. The Barstow to Vegas and Johnson Valley to Parker races have not been run for nearly 15 years, so with the exception of the events that have used the "C Routes" near the Spangler OHV area, all competitive racing has been located within the OHV Open areas. Alternative A does not reduce the size of the OHV areas; therefore, the amount of land available for competitive events compared to the No Action Alternative would not be changed.

Use of the "C" competitive routes would be partially restored by Alternative A. The original "C" route networks were located in the Summit Range (adjacent to and just south of the Spangler Hills Open Area) and in the region immediately northeast of the Spangler Hills Open Area. Approximately 2/3 of the "C" routes located to the northeast would be reinstated, and would provide opportunities for staging competitive events that utilized both this area and the adjoining open area lands. The "C" routes would not be reestablished in the Summit Range, because this area is immediately adjacent to the Fremont-Kramer tortoise DWMA. About ten miles of additional open routes would be designated in the Summit Range, however, that correspond to the location of several of the old "C" routes. Although these routes could not be used for competitive events, they would provide linkages for vehicle access and touring in the Summit Range, a use formerly made of the old "C" routes in this area.

Some recreational touring opportunities would be lost due to the 35 miles of closures within the Fremont-Kramer tortoise DWMA (Red Mountain subregion) necessary to offset the reestablishment of the "C" routes. As no competitive use of this area is currently permitted, there would be no loss of competitive motorized vehicle recreation.

Both the 29 Palms Wild West Grand Prix and Adelanto Grand Prix are held entirely on private property that has previously been approved for recreational activities such as this. As such, no effect is anticipated.

Stopping, Parking and Camping: In general, the proposed stopping, parking, and camping prescriptions (MV-5 and MV-6) appear to be workable in the majority of situations. However, they do raise some concerns. Strictly limiting stopping and parking to within *50' off*

designated routes may eliminate motorized access to the ends of some of the spur roads that branch from through routes and lead, after a few hundred feet, to campsites or trailheads. Only the first 50 fees of such routes would be open. Campsites at the end of these spur routes tend to be popular because they afford visitors additional privacy. This would make it more difficult to reach these campsites. Limiting camping to previously disturbed areas (MV-5) would be difficult to enforce, unless these sites are marked or otherwise identified. Lack of compliance would greatly minimize the effectiveness of this proposal.

The stopping, parking and camping limits would significantly reduce the DWMA acreage susceptible to disturbance by off highway vehicle use. Acreage within the driving, stopping and parking corridor would be reduced within the Fremont-Kramer, Superior-Cronese and Newberry-Rodman DWMAs follows:

- Fremont-Kramer DWMA: from 52,361 acres to 10,138 acres
- Superior-Cronese DWMA: from 54,499 acres to 9,833 acres
- Ord-Rodman DWMA: from 17,512 acres to 3,146 acres

Recreation Venues Accessed by Route Network: The June 30, 2003 network adopted by the BLM, as modified by Alternative A, provides access to the great majority of recreation sites identified during the 2001-2002 field inventories. Located within 100 feet of designated open routes are the following: 931 of 1369 campsites; 272 of 379 scenic views; 77 of 100 staging areas; and 28 of 37 trailheads.

4.2.3.6 Regional Transportation System

The West Mojave Plan is expected to have little or no effect on the circulation patterns of the planning area. There are no recommended public road closures as a result of this plan. This section only evaluates the maintained public roads in the plan area; unmaintained or private routes are more closely analyzed in the route designation section of this plan. As mitigation measures are further defined by the plan, potential maintenance issues along roadways will need to be addressed, including the construction of desert tortoise highway fencing and the assignment of responsibility for fence maintenance.

4.2.3.7 Visual Resources

Visual Resources: Alternative A would not result in significant impacts to visual resources.

The acreage of lands disturbed by off highway vehicle routes would decrease as implementation of the motorized vehicle access network proceeds. The West Mojave Plan's route network implementation strategy (see section 2.2.6.8) includes a new route restoration program that would be applied to rehabilitate closed routes. Within the redesign area, 3,604 miles of existing vehicle routes were identified during field surveys conducted in 2001 and 2002. Approximately 40 percent of these existing routes would be closed, portions restored and the

remainder allowed to naturally revegetate. As a result, the landscape of the redesign area would see a gradual transformation towards one with substantially less ground disturbance than at present. Assuming the average tread width of these closed routes is approximately 6 feet (that is, assuming 50% are 2 track routes of 8 feet width and 50% are single track routes of 4 feet width) the total footprint of these closed routes represents approximately 1,700 acres. Restoring these acres would be a significant enhancement of the planning area's visual resources.

In addition, the West Mojave Plan proposes to narrow the belt of land adjacent to open routes within tortoise DWMAs that would be available for stopping and parking. Currently that belt is 600 feet wide; under Alternative A it would be narrowed to 100 feet. This would result in significantly less land being subject to any impacts, including visual, that would result from stopping and parking activities than was the case in the past, both prior to and after the adoption by BLM of the June 30, 2003 route network. Acreage within the driving, stopping and parking corridor would be reduced within the Fremont-Kramer, Superior-Cronese and Newberry-Rodman DWMAs follows:

- Fremont-Kramer DWMA: from 52,361 acres to 10,138 acres
- Superior-Cronese DWMA: from 54,499 acres to 9,833 acres
- Ord-Rodman DWMA: from 17,512 acres to 3,146 acres

A dramatically changed natural landscape is unlikely to result from adoption of streamlined incidental take permit procedures. Most of the projected population and housing growth (88 percent, in fact) is expected to take place within the incorporated cities, and it is highly unlikely that any significant amount of land would be developed within the HCA boundaries. To the degree that the mitigation fee and streamlined procedures has an effect on development patterns, it will be to make it relatively less expensive than under the No Action alternative to develop parcels within disturbed habitat, including tortoise "No Survey" areas, and relatively more expensive within conservation areas. Encouragement of "infill" development should result in less alteration of the natural landscape than would result under current procedures.

4.2.4 Motorized Vehicle Access Network

The motorized vehicle access network, as adopted by BLM on June 30, 2003 and modified by Alternative A, would meet recreational and commercial needs throughout the 30-year term of the West Mojave Plan. The network would consist of 5,098 miles of motorized vehicle routes, including single-track routes that were not necessarily addressed by the 1985 and 1987 route designations. Layout of the route network in the redesign area would provide better opportunities for touring, technical 4WD, and loop routes than the network that existed prior to June 30, 2003 offered. Table 4-45 addresses these factors in greater detail, and discusses the general effects of the proposed motorized vehicle access network on public access to each of the route subregions.

Table 4-45
General Impacts of Route Designations On Motorized Vehicle Access

SUB REGION (MILES OPEN)	DIRECT IMPACTS OF ROUTE DESIGNATIONS ON ACCESS OPPORTUNITY	INDIRECT IMPACTS OF ROUTE DESIGNATIONS ON ACCESS OPPORTUNITY:	NOTES
Coyote (269)	Relatively more routes were closed in the area of Coyote Dry Lake and Superior Valley, providing less access in this area.	The general touring opportunities lost due to closures will shift such activities to other similar areas where such opportunities still exist, such as the northern portions of the Superior sub region.	Closures of routes in this sub region are moderate and primarily aimed at duplicity. The eastern legs of Coyote that surround the Soda Mountains WSA had moderate closures of routes and thus, less access to the WSA.
El Mirage (99)	A proportionately higher number of route closures occurred in those areas characterized by "bajada" topography, limiting travel in this type of landscape. A proportionately higher number of routes were kept open in the more mountainous terrain. A proportionately higher number of routes were kept open in the more mountainous terrain, such as in the Shadow Mountains near Rabbit Hole Mine.	Route closures in the flatter topography will afford more buffer protection to the private properties that checkerboard the area, thereby reducing conflicts between different uses.	The network largely addresses recreational and environmental needs. Route closures in the flatter topography will shift some of that use to other areas where the concerns related to tortoise protection are not as high, e.g. to the El Mirage OHV Area, in particular the El Mirage Dry Lakebed.
El Paso (324)	No change from the currently designated route system.	No change from the currently designated route system.	
Fremont (431)	A proportionately higher number of route closures occurred in those areas characterized by "bajada" topography, limiting travel in this type of landscape. A proportionately higher number of routes were kept open in the more mountainous terrain of the northern portions of this sub region, including Gravel Hills, Hamburger Mill, and Fremont Peak Area.	Proportionately higher rates of route closures in high tortoise density areas in El Mirage, Kramer, and Superior sub regions should shift more activity to the more mountainous, historically popular northern portions of this sub region, e.g. Gravel Hills, Hamburger Mill.	Route designations considered historic recreation patterns and sensitive species concerns (particularly desert tortoise). The route system designated under this alternative both more accurately reflects and addresses both the access needs and environmental concerns of the entire planning area.
Juniper (97)	Subregion is relatively small, with a viable route network serving recreational opportunity. The viability of the network would be retained by the modifications proposed by the West Mojave Plan EIR/S.	Subregion serves as a staging area for visitors from the Apple Valley wanting to recreate in the San Bernardino Mountains. One route of access would be through the Grapevine Canyon Area of this subregion into the Coyote Flat area of the San Bernardino National Forest, while another would be from the Juniper Flats area in the subregion into the Deep Creek area of the San Bernardino National Forest via the Pack Trail.	Good equestrian access from the Apple Valley to the San Bernardino National Forest through the Grapevine Canyon area, as well as into the Deep Creek area via the Pack Trail.

SUB REGION (MILES OPEN)	DIRECT IMPACTS OF ROUTE DESIGNATIONS ON ACCESS OPPORTUNITY	INDIRECT IMPACTS OF ROUTE DESIGNATIONS ON ACCESS OPPORTUNITY:	NOTES
Kramer (361)	A proportionately higher number of routes were closed in the flatter areas of Kramer where tortoise concerns were greatest, whereas in the historically more actively visited areas (e.g. Kramer Hills for rock-hounding and Iron Mountains for family camping) a proportionately higher number of routes were left open.	The large closure rate in southern Kramer will reduce the impacts from the Silver Lakes urban area and should allow for the continued existence of high tortoise densities in this area. In a like manner, the high route closure rate in the central and center-north portions of this sub region should facilitate the continued existence of healthy tortoise populations in this area.	Many of the routes crossing this sub region were created by race events in the 60's and 70's. Those events have since been shifted to the "Open Areas" designated for that purpose. Those routes and the Kramer subregion as a whole are not as popular as other areas for motorcycle use. Also because most of the sub region is comparative flat relative to other sub regions, it offers less interest for vehicle recreation. These factors make it conducive to emphasizing route designation that is more focused toward tortoise protection.
Middle Knob (90)	The low-density route network in this sub region is planned for low closure and therefore a viable route network will continue and will provide access to mines, and for the servicing of utility corridors.	Low to moderate indirect impacts because of low level of route closure.	This area could have a special recreation demand because it offers recreational opportunity at higher elevations, such as in the Chuckwalla Mountains, which is over 5,000 feet, and Middle Knob peak at 6,000 feet.
Newberry – Rodman (160)	Benefits from direct access from Interstate 40, which provides access to Newberry Mountains Wilderness, Rodman Mountains Wilderness, and the Johnson Valley OHV Area to the south.	Subregion is an access point to other areas of interest either within the subregion or surrounding it. Access would continue to be provided for touring, rock hounding, and visiting mining sites (such as Silver Cliffs Mine, Bell Mine, and Camp Rock Mine).	The subregion is bordered on the southeast by the Marine Corps Air Ground Combat Center.
Red Mountain	The rugged northern portions this sub region near 395 have a very high density of mine claims. In order to maintain this access need, relatively more routes were designated open in this area, although 35 miles of the routes opened on June 30, 2003 would be closed within high-quality tortoise habitat to offset the reinstatement of the "C" route program. In the flatter southern and eastern portions of this sub region tortoise concerns led to proportionately more route closures.	The greater closures in the eastern and southern portions of Red Mountain also will afford greater protections to the tortoise, but will hinder recreational opportunities. Recreational activity will therefore shift to the more mountainous areas of this and the Fremont sub regions where more recreational opportunity was maintained.	Route designation in this sub region like others that were located within desert tortoise DWMAs emphasized encouraging recreational opportunities in the more mountainous regions north of Twenty Mule Team Road by opening a more extensive network in those areas. On the other hand leaving relatively fewer routes open in the flatter bajadas terrain facilitated tortoise protection.

SUB REGION (MILES OPEN)	DIRECT IMPACTS OF ROUTE DESIGNATIONS ON ACCESS OPPORTUNITY	INDIRECT IMPACTS OF ROUTE DESIGNATIONS ON ACCESS OPPORTUNITY:	NOTES
Superior (401)	The relatively high number of route closures in those areas known for high tortoise concerns and within the Lane Mtn Milk vetch Conservation Area will reduce a variety of recreational opportunities in those areas. Many routes are closed in areas of low recreation interest and where sensitive areas occur such as the Rainbow Basin ACEC. Fewer closures in high value recreation areas.	The high level of route closures in those areas known for desert tortoise or Lane Mountain milk vetch should afford these species additional protection from a variety of vehicle-related impacts. The closures associated will also shift recreational use away from these generally flatter areas to areas where more recreational opportunities are facilitated by a denser open route network.	This largest of sub regions had both a diversity of recreational interests as well as environmental concerns. The Superior Sub Region has a lot of flat area offering lower recreation value and greater habitat value for the tortoise. Therefore a high level of closures help the tortoise without significant impact to access opportunity

Most of the recreational needs and opportunities identified by the public take place in the more mountainous terrain of the planning area, such as the Gravel Hills in the Fremont subregion and the more mountainous areas of the Red Mountain subregion, while many of the more sensitive desert tortoise areas are located on the bajadas and in washes. The network adopted on June 30, 2003 and modified herein would take account of this by leaving relatively more routes open in the more mountainous terrain (e.g. Kramer Hills, Iron Mountain, Gravel Hills, Hamburger Mill, Red Mountain, the Superior sub region hills north and east of Rainbow Basin), and impose relatively more closure in the flatter (e.g. characterized by bajadas and washes) surrounding areas (e.g. in portions of the El Mirage, Kramer, Fremont, Red Mountain, and Superior subregions). The network would address other sensitive species concerns (which included many immobile plants) by avoidance.

Because the designated open route system is less than the entire inventoried network (including non-designated "volunteer or legacy" routes), visitor use on the designated routes would increase. Visitors would still be able to experience solitude in a number of natural areas due to the size of the area and the extensive open route network that would be provided. Examples of where this solitude can still be experienced occur in the wide open expanses of the Superior sub region.

The network provides for relatively undiminished camping opportunities throughout the planning area. Campsites in the Iron Mountains, Kramer Hills, Gravel Hills, Hamburger Mill, the Pinnacles, and around Rainbow Basin, as well as a number of other areas would still be largely accessible to the public. The staging areas and trailheads associated with many of these campsites would remain available for equestrian endurance rides, rock hounding, hiking, birding and hunting. Located within 100 feet of designated open routes are the following: 931 of 1369 campsites, 77 of 100 staging areas, and 28 of 37 trailheads identified during the 2001-2002 field surveys.

Abundant opportunities for both dual-sport motorcycle and 4WD touring still exist throughout the planning region. The network provides connectivity of routes by route type, such as single-track or two-track, enabling long touring routes to be created that would allow enabling

visitors to travel over large areas. These recreational routes traverse a variety of landscapes. Thus, a visitor, whether on a dual sport motorcycle or SUV, may engage in multi-hour (e.g. through the Kramer Hills or up Mesquite Canyon through the Bonanza Gulch of the El Pasos) to multi-day tours (e.g. dual sport motorcycle rides starting in the El Mirage sub region and ending in the Ridgecrest sub region or SUV tours traveling along the many old historic roads that lace the planning area, such as the Mojave Road, the Spanish Trail, and Isham Road. Many of these historic roads are noteworthy for the distance and variety of terrain that they allow the experienced desert visitor to travel.

More challenging or more technical routes were also left in place wherever possible. Generally these were located in the more mountainous terrain, such as the Gravel Hills of the Fremont sub region or the Iron Mountains of the Kramer sub region. A greater number of routes tended to be left open in the more mountainous terrain, while more were closed in the bajadas and washes.

The needs of specific recreational interest groups would be met. These include:

- *Rock hounds and gem collectors.* Access to a number of sites and destination areas identified as important during the planning process was retained. Some of these sites included spots in the Newberry-Rodman sub region, the Kramer Hills and a number of dispersed sites in the Superior sub region.

- *Equestrians, including endurance race riders.* Access to staging areas is provided, and motorized routes that parallel equestrian endurance courses were, in many cases, retained as open routes. For example routes paralleling the Grass Valley and Golden Wilderness Areas often serve equestrians entering these wildernesses. This factor weighed prominently in keeping some of these routes open.

- *Upland game hunters.* Routes that would enable volunteers (such as Quail Unlimited) and CDFG to maintain guzzlers were retained, as were other routes that served to access hunting areas that are only utilized during the fall hunting season. In particular a number of specific sites and their associated routes were identified in the Red Mountain sub regions.

- *Informal and formal historic sightseeing societies.* Access to many old routes, mining sites, and homesteads that are of special interest to these organizations was retained. This is important because guidebooks, maps and magazine articles publicize these sites, making them popular destinations.

The route network would also meet commercial access needs, including access to the following:

- Utility easements such as electrical transmission lines, communication towers (both public and military) and underground communication lines, pipeline corridors, support

facilities, support and maintenance roads;

- Ranching facilities including outbuildings, corrals, water tanks, wells, and service roads; and,

- Mining facilities including tunnels, pits, buildings, claim stakes, and service roads.

Private property access would be provided to each known privately held parcel. Factors that were taken into consideration in determining the appropriate access route were the size and remoteness of the parcel, proximity to other areas of development and/or occupancy, topographic features (e.g. canyons or ridgelines) that might bisect the property and thereby necessitate two or points of access and safety issues. In one area, Homewood Canyon, known occupied parcels were afforded more than one point of access due to the risk of flash floods.

The modified route network would have few unmet access needs. Although some areas, particularly those identified as having higher than average tortoise densities, may have substantially fewer routes than other areas, those routes that do remain open would provide access to meet inventoried needs. In some areas, however, access needs (primarily recreational) would be constrained due to resource needs. These would include portions of the following subregions:

- The El Mirage subregion may lack motorcycle and vehicular touring opportunities in the bajadas north of the Shadow Mountain complex.

- The Kramer subregion, both west and northwest of Silver Lakes, may not meet demands for general motorcycle recreation and touring.

- The Red Mountain subregion west of Cuddeback Lake, where demands for general motorcycle, vehicle touring and camping opportunities would not be fully provided.

These shortfalls in recreational access would be compensated by available access for similar forms of recreation elsewhere. Vehicular and motorcycle touring opportunities would be abundant in many other sub regions where the resource issues are not such a major concern. Off highway vehicle open areas, moreover, would help absorb displaced demand for general motorcycle use.

Most of the Backcountry Discovery Trail System would be designated open. In those cases where certain BDTS routes were recommended for closure due to resource concerns, alternative open routes are available to maintain the continuity of BDTS.

The modified network generally avoids dry lakebeds (such as Harper Dry Lake in south Fremont, Superior Dry Lake and Coyote Dry Lake). Routes would remain open on or around each dry lakebed only where necessary for efficient travel management, where necessary to meet a specific need of the area such as resource protection or public safety. No change is anticipated

in the management of the Sunfair Dry Lake area. BLM manages only three-fourths of a section in this area. The vast majority of the area currently used for OHV use is held either privately or by San Bernardino County. San Bernardino County once planned on an OHV recreation facility at this area, but eventually abandoned these plans because of the cost associated with the management of such a site. Although recreational OHV visitor use has continued, there have not been any serious issues identified by either the County or BLM.

Juniper Subregion: The following discussion addresses the effectiveness of the Juniper subregion's modified route network in providing recreational and other motorized vehicle access in a manner that is compatible with the area's natural and cultural resources. The modified network includes a total of 97 miles of open routes and routes limited to single-track vehicles, a decrease of 55 miles from the 152 miles of routes open to all vehicles under the June 30, 2003 network.

Motorcycle Recreation: The modified network is expected to address the growing demand for motorcycle use in the area while reducing the proliferation of routes. The Fall 2003 field inventory identified 52 miles of routes classified as "primary single track." Of these, 25 miles would be specifically designated for motorcycle touring, and would be unavailable for 4-wheel-drive access. A total of 27 miles of single-track routes were closed.

Motorcyclists seek loop opportunities and access to the San Bernardino National Forest. The modified route network provides both. Loops are provided in the vicinity of upper Arrastre Canyon in a manner that utilizes ridgelines while avoiding sensitive riparian sites. Former route J1299 provides a direct and scenic route from Apple Valley to the National Forest, and forms a loop with motorcycle trails further east.

By establishing a network of routes for motorcycles only, one that meets the needs of these recreationists, the indiscriminate use of public lands for motorcycle recreation would be replaced by the use of defined routes of travel. This would result in fewer disturbances of sensitive habitats, while providing enhanced recreation opportunities. It will enhance BLM's ability to monitor this activity. Limiting the routes to motorcycle use will preclude the long-term conversion of existing single tracks to much broader routes that could be traversed by four wheel drive vehicles and that hold less appeal to motorcycle recreationists. It will reduce the cost of maintaining the route network.

Connectivity with National Forest Routes: The San Bernardino National Forest supplied their route network and requested that the Juniper subregion route network connect seamlessly with the National Forest. Their concern was to ensure that BLM open routes did not end abruptly at the forest boundary. This was accomplished with the exception of two areas. One of these areas was a part of the route that provides access to the Deep Creek Hot Springs from the west. This route is currently open. The other area was a route (RJ 3025) leaving Coxey Truck Trail heading northeast, toward the VP Mine, just after entering the USFS. These two areas were reviewed with San Bernardino National Forest staff, which concurred that the route access added significantly to the Juniper sub-region network in a manner that would not impact the forest.

Biological Resources: When compared to both the 1985-87 network and the BLM's Designation Project network, the modified network does more to limit vehicle impacts to sensitive riparian areas. The reduction of routes crossing and paralleling Arrastre Canyon will benefit both the riparian plants and the migratory birds that use this habitat seasonally and for nesting. Potential habitat for the least Bell's vireo will be protected. Six single-track routes and six dirt roads that access the stream were designated closed between the power line road (RJ 3002) and the Forest boundary. In Grapevine Canyon, no routes access the streambed except for a single crossing of Grapevine Canyon Road. Two single-track routes and one dirt road that access the stream were designated as closed.

Most of the routes that access isolated springs have also been designated as closed. The majority of these are small single-track spurs extending a distance of less than ¼ mile. Wildlife and potential cultural sites will benefit from these closures.

The overall reduction in the route network will benefit the gray vireo and the San Diego horned lizard. Continued enforcement to insure that users are staying on the open routes will be necessary to maintain the habitat for these species.

Cultural Resources: The modified network has been compared to known cultural resource sites and adjusted to avoid them. A special focus was placed on the avoidance of springs and riparian areas.

The portion of the proposed network that lies within the Juniper Flats ACEC is composed of open routes and routes limited to motorcycle use only. The overall mileage is comparable to the miles of routes open to all vehicles in the 1988 ACEC management plan. The design of the modified network is very similar to the 1988 ACEC network, differing only in the closure of a cluster of short spur routes in southern Ord Mountains, the closure of a short spur route along the northern boundary of the ACEC, the opening of two short (less than half mile long) connector routes along the southern boundary, and the designation of a route limited to single-track use that crosses the eastern portion of the ACEC (former route J1299).

The modifications of the route network within the ACEC are unlikely to result in additional impacts to cultural resources when compared to the 1988 ACEC network. Because no route proliferation has been observed along former route J1299, it is unlikely that opening this route to single-track vehicles would increase the threat of damage to or vandalism of any uninventoried cultural resources near Cottonwood Springs. Providing a designated route may, in fact, serve to focus any current indiscriminate motorcycle use onto the defined motorcycle access route.

Other Issues: The modified route network addresses the other concerns and issues described in Chapter 2, at section 2.2.6.7, in the following manner.

- The modified route network provides access to facilities used by ranchers, such as grazing improvements and developed springs. The network would allow the rancher to successfully continue his winter grazing operation.

- The utility route would remain open, meeting the needs of utility companies to maintain the transmission line.

- The road structure is compatible with minimum impact recreation needs, as it provides access for equestrians, hikers, birdwatchers and others to park and unload in reasonable proximity to favored recreation destinations. This includes four-wheel drive access to those Deep Creek Hot Springs trailheads that are located on public lands.

4.2.5 Cultural Resources

4.2.5.1 Activities That Would Affect Cultural Resources

Activities proposed in Alternative A that may affect cultural resources include the following listed actions.

- Implementing actions for Conservation Areas and new, non-cultural resource ACECs within DWMAs, such as construction of fences or culverts, placement of signs and kiosks, rehabilitation and restoration of routes or larger areas, removal of structures and debris if 50 years old or older;

- Multiple use class changes that increase or decrease protection of cultural resources, depending upon the nature of the change (generally, L to M decreases protection of cultural resources, e.g., and vice versa);

- Land exchanges that result in removal of important cultural resources from protective federal management (which would be mitigated through CEQA for development);

- Designation of routes of travel as open to vehicle use if those routes occur on or near cultural resources; and

- Decisions to continue use of existing designated routes that are located inside, near, or in the vicinity of cultural resources.

For many of these activities, significance of effect would be evaluated when specific actions are proposed and their locations are known. Specific actions would be subject to full compliance with cultural resource statues and regulations, and managers must not approve proposed activities until compliance with Section 106 of the National Historic Preservation Act has been completed and documented, including consultation with the State Historic Preservation Officer and federally recognized Indian tribes.

The effect of BLM routes of travel on public land cultural resources has not been fully determined because information needed to assess effect is incomplete at the present time; however, records and observation indicate the effect on some public land sites is significant. To mitigate significant impacts, route designation would be reviewed under the Section 106 process, and a programmatic approach to Section 106 compliance for routes of travel within this planning area is being discussed with the California State Office of Historic Preservation.

4.2.5.2 Regional Analysis: Potential Areas of Conflict

Christmas Canyon ACEC: The 1985-87 route designations would be adopted for the portion of this ACEC outside the Spangler Hills Open Area. The effects of this designation process have not been determined and have not been subject to Section 106 consultation. Under Section 106 of the National Historic Preservation Act, effects of an action and proposed mitigation must be subject to consultation with the State Office of Historic Preservation prior to making a decision. Current on-going inventory within this ACEC has resulted in recordation of approximately 100 previously unknown archaeological sites and has identified the presence of an extremely significant complex of sites in the ACEC and in adjacent areas. Analysis of materials from these sites places them amongst the oldest known sites in the California Desert and throughout the United States. Route designation decisions here should fully consider impacts to or opportunities to protect these very important and very fragile cultural resources.

Jawbone/Butterbredt ACEC: Routes within this ACEC have only recently been subject to partial Section 106 consultation. Inventory occurring now has resulted in recordation of more than 100 previously unknown sites within the ACEC and open areas contained within the ACEC. This data, still being processed, is likely to affect any existing designated route system. Sites within the ACEC are currently being affected by the designated route system, including the Dove Spring site (2.5 feet of artifact-bearing midden soil at the junction of three open routes). Several other significant sites are known to be suffering impacts from designated routes.

Last Chance Canyon ACEC: The effects of the 1985-87 designated route system on cultural resources have not been determined because route inventories for cultural resources have not yet been carried out. This area has extremely high site densities and is part of the Last Chance Canyon National Register District. The decision to adopt this route system has not been subject to Section 106 requirements. The decision to retain existing route designation in this area would continue existing effects for an unidentified length of time.

Kelso Creek Monkeyflower Conservation Area: Fencing private/BLM property lines for the Kelso Creek Monkeyflower Conservation Area has very high potential for disturbance of significant sites in the Kelso Creek drainage. Until exact locations of fences are proposed the full impact cannot be identified. This and other such actions would require compliance with Section 106 of the National Historic Preservation Act.

Restoration Activities: Restoration activities such as that proposed for habitat of Kern buckwheat may also cause impacts to cultural resources. Data are lacking for the area but

prehistoric site densities are high on Middle Knob so the potential for cultural resources to occur in areas needing rehabilitation is high. Since these areas are already disturbed it is to be assumed that cultural resources here would also be in disturbed condition but how seriously cannot be predicted. Project specific actions would be subject to compliance with Section 106 of the National Historic Preservation Act.

Inyo County Land Reclassification: Changing the multiple use class on 6,400 acres of land in Inyo County to unclassified for immediate disposal would also require compliance with Section 106 of the National Historic Preservation Act. If significant sites (i.e. sites that meet eligibility criteria for listing in the National Register of Historic Places) were found to be present, it would be necessary to consider retaining the parcels permanently in federal management for protection and preservation of the sites. Transfer of title of such a parcel out of protected status would require mitigation of effects and data recovery before the land is transferred. Other actions that have the potential to affect cultural resources and that would have to be evaluated under Section 106 of the National Historic Preservation Act include eliminating mine pits, trash dumps, and other existing conditions (if old enough to be historic, or if they are located on top of or adjacent to cultural resources), soil scarification, etc.

Wildlife Water Sources: A decision to leave existing artificial water sources in place and to continue to allow access to these facilities for maintenance would result in continuing impacts to some prehistoric sites. A number of guzzlers within the planning area have been built into significant prehistoric sites, including sites in the Last Chance Canyon National Register District and Red Mountain Spring National Register District. Recognition of on-going impacts to significant sites requires that efforts be made to reduce or eliminate the impacts under Section 110 of the National Historic Preservation Act. A decision to leave them there and continue their use and maintenance, rather than moving the activity elsewhere, would require mitigation of effects to the cultural properties being affected.

4.2.5.3 Off Road Vehicle Route Designation

Route designation has the greatest potential to both impact and protect significant cultural resources, depending upon the criteria used to designate routes as open or closed. A study of impacts to cultural resources in the California Desert that was done in concert with preparation of the CDCA Plan identified the combined effects of vehicle routes and activities in and on archaeological sites and vandalism resulting from increased levels of access as OHV use became more popular as the greatest impact and greatest threat to cultural resources in the California Desert (Lyneis *et al.* 1980). This study referenced similar studies in other states that reached the same conclusions. Vehicle routes across or near archaeological sites affect those sites in various ways, depending upon the nature of the archaeological materials, the nature of the soils at the site and in the immediate vicinity, and the topography of the immediate area. Softer soils, and especially "midden" soils[9], are easily displaced by vehicle tires along with artifacts or other cultural materials that may be in the route. Artifacts and the soil matrix in which they exist may

9 "Midden" is a term used for the highly organic soils that form on some prehistoric habitation sites as a result of long-term or intense occupation of the site location.

be displaced both horizontally and vertically as vehicle tires move through the soil. Artifacts such as projectile points, flakes, beads, pottery and other thin items of stone, bone, shell, etc. may be broken or crushed by the weight of vehicles passing over them. Under some conditions, larger stone objects such as manos and metates may be cracked and broken by vehicles. Subsurface features such as hearths or burials may be exposed either directly by vehicle use on the road, or indirectly by erosion channels created by vehicle use. Erosion of routes may affect sites that are off the route but downstream in the erosion channel. Vehicles passing each other or going wide to avoid ruts may gradually widen a route so that it cuts deeper into the portions of sites along the sides of routes. Routes through historic sites may also displace or damage artifacts in the road or immediately adjacent to the route. Effects may occur from the actions, both deliberate and inadvertent, of the occupants or operators of the vehicles, such as collection of artifacts or erosion as a result of the use of the route. Similar effects can also occur to cultural resources that fall within the 600-foot wide (300 feet on either side of the centerline) corridor along routes in which parking, camping, pulling off, etc. are allowed.

4.2.5.3.1 Effects Of Networks: Ridgecrest Field Office

Assumptions and Methods: Within the Ridgecrest Field Office Area, no cultural resources field inventory has been carried out on the proposed 2002 route designation updates. Assessment of effects is based upon data available in a GIS database system. This data includes the 1985-87 route designation system for all of the sub-regions subject to route designation and 2002 updates for Middle Knob and Red Mountain sub-regions. The database also includes static data from the California Historical Resources Information System generated over a year ago. New inventory and archaeological site data are not included in the database. Information in the database includes recorded prehistoric and historic site locations and areas that have been subject to cultural resources inventory. The accuracy of the following analysis is directly proportional to the accuracy of the digitized data available. Since this data has been collected over time from various sources and no field checking has been done, the accuracy is unknown. For purposes of analysis it is assumed that data in the GIS database accurately represents the locations of cultural resources and the locations of vehicle routes under consideration. The actual degree of accuracy/error is unknown. Since levels of archaeological inventory for the planning area in general are very low, 1% to 2% in most areas, the predictive value of the archaeological data is low as well. For purposes of analysis, the width of routes was arbitrarily set at 10 feet on either side of the centerline, the centerline being the line in the GIS database that represented each particular route. This would, of course, be too narrow in some instances and too wide in others. Also for purposes of analysis, effects or potential effects of the 600-foot corridor (300 feet on each side) were analyzed. In some areas this corridor would be narrowed under actions proposed in this alternative. Finally, time constraints did not allow for determining whether or not all of the sites in the database are still in place. Some may have been subject to mitigation as a result of actions that have occurred since the sites were first recorded; however, it is unlikely that the bulk of the sites have been evaluated for significance or subject to any data recovery.

The impact to cultural resources within the Barstow Field Office Area by the route network proposed in Alternative A was evaluated using 7.5 minute quadrangle maps and overlays. GIS route data was not available; therefore, due to time constraints, analysis was restricted to proposed open routes.

Sub-regions selected for route designation updates in the Ridgecrest Field Office area include Red Mountain, Middle Knob, Fremont, Ridgecrest and El Paso. Updated route networks were available for analysis of Red Mountain and Middle Knob. The other sub-regions would continue with the 1985-87 or other previous route designations, either permanently or (in the case of Ridgecrest and El Paso) until the completion of the El Paso Collaborative Access Planning Area process.

Red Mountain Subregion: In the Red Mountain sub-region three recorded sites are directly bisected by routes contained within the 2002 digitized route system. One of these routes, RM-1184, would be closed under the proposed 2002 route designation system. The site on this route was recorded in 1976 as a small milling station, with no more recent data available. Although this particular route is proposed for closure, use of the route may have already affected the site.

Three routes proposed for open designation intersect inside the Blackwater Well National Register District and inside the boundaries of the primary prehistoric habitation site (first recorded in the 1930s) that is the focal point of the National Register district. Use of the sites within the district "extended from about 1200 B.C or earlier to possibly as late as A.D. 1820. The main village itself, designated CA-SBR-2322, has been described as 'one of the richest archaeological sites in the California desert' (Hickson 1978:7)" (Blackwater Well National Register Nomination Form). The site is about three acres in size and about one meter deep. The three routes, which intersect on top of the village site, have caused considerable damage to the site; continued use of the routes would result in continued deterioration of the site. Since the primary goal in National Register districts is preservation of significant cultural resources, avoidance of impacts by closing the routes would be the most appropriate option. If the routes were designated open, mitigation of effects in the form of scientific data recovery and analysis would be required under Section 106 of the National Historic Preservation Act. Continued degradation of the site and scientific data recovery may both have impacts on Native American values attached to the site. Loss of the site would preclude on-site public interpretation/education opportunities. One of the same three routes intersects a second site inside the National Register district, SBr-10278, a milling station described as in fair condition when recorded in 1978. The artifacts recorded on the surface are all small and lightweight enough to be easily damaged or scattered by vehicle use of the road through the site. Several other archaeological sites within the National Register district may be close enough to proposed open routes to fall within the proposed 100-foot corridor (50 feet on either side of the centerline inside a DWMA) in which camping, parking, etc. are allowed. Sites within the district may well also fall within "existing disturbed areas" along routes in which camping and parking would be allowed under Alternative A. Field inventory would be required to determine how many sites within the district would be subject to impact under Alternative A. Almost all of the known

sites within the district have fallen within the existing 600-foot corridor along routes for camping, stopping and parking, so all of the sites within the district have already been impacted to some degree by the existing route network. Because effects to cultural resources from vehicle access can occur beyond established vehicle corridors, route designation within the National Register district should be re-evaluated, taking into consideration the effects of travel, vehicle use, and related activities on archaeological properties inside the district.

The GIS database indicates an additional 22 archaeological sites that fall within the existing 600-foot corridor allowed for camping, parking and stopping. These sites include temporary campsites, roasting pits, milling (food processing) sites, petroglyphs, and habitation sites. Some are within the Red Mountain Spring ACEC and the partially over-lapping National Register district. These sites have already been impacted by vehicle activity along the routes. Fourteen of these sites are along routes proposed for open designation under the current plan, including RM2018, RM2001, RM2036, RM2034 (three sites along this route), RM2051, RM4001, RM3021, RM2017, RM2020, RM2018, RM2051, and RM2129. RM 2034 has been closed in the final Plan, protecting three sites. Reduction of the corridor width to 100 feet (50 feet on either side of the centerline) may decrease the number of known sites within corridors of vehicle use but even sites that are no longer within the corridors would have already suffered some degree of damage. Time constraints did not allow for full analysis of how changing the corridor width would affect impacts to cultural resources. The actual number of sites that have been affected and would be affected by the route network system is unknown due to the very low level of inventory in the area and due to the fact that impacts from vehicle access can extend beyond the allowed vehicle corridor.

In the absence of valid levels of inventory a certain amount of prediction regarding archaeological site densities in the Red Mountain sub-region and consequent levels of impact to cultural resources within vehicle corridors can be made using cultural resource sensitivity polygons based upon inventory for the CDCA Plan. These sensitivity polygons identify areas in which the potential for significant cultural resources is considered to be high or very high in relationship to surrounding areas. Documentation justifying a determination of high or very high sensitivity was based upon such factors as number of recorded sites, types of sites, diversity of sites within an area, uniqueness/rarity of known sites, scientific value, aesthetic value, integrity of known sites and their surroundings, socio-cultural and Native American concerns, and similar values. Predictive site densities for the Red Mountain planning unit run around 4.5 sites per square mile. Inside the sensitivity polygons site densities are expected to be higher than this average. Approximately 270 miles of route and 10,118 acres of route corridor fall inside the high/very high sensitivity polygons. It is expected that some degree of impact has occurred to cultural resources within these areas. Of these routes, 162 miles would be designated as open under this alternative. The 600-foot route corridor would amount to 7,791 acres. This alternative would reduce levels of impact to resources on approximately 3,000 acres if the route corridors stayed at 600 feet. Since the route corridors would drop to 100 feet inside DWMAs impacts to cultural resources may be reduced further. Currently available data does not allow for finer definition of impact over the sub-region as a whole.

Middle Knob Subregion: Five routes proposed for open designation, MK0010, MK0013, MK0014, MK0016, and MK0019, intersect recorded archaeological sites. MK0010 intersects 12 recorded sites, MK0013 two recorded sites, and the other three routes intersect one recorded site each. Site types intersected by these routes include a series of prehistoric lithic scatters at which stone was quarried and worked into tools. Some of these sites are very large and were observed to contain formed tools as well as scatters of flakes and cores that are the detritus of making stone tools. One stretches for 400 meters along a route. Some contain evidence of use as temporary campsites for collection of resources other than tool stone. One site is a historic site containing segments of historic routes, structures, and debris scatters that date from 1848 to the present. Many of the site records note vehicle damage. An additional 5 sites are recorded within 600-foot corridors along proposed open routes. A short route segment that is proposed for closure bisects one additional site, a lithic scatter that covers over 5000 square meters. The site record indicates some damage has already occurred to the site.

For predictive purposes, approximately 15 miles of route (approximately 3,000 acres of route corridor) that is proposed for open designation fall within areas that have been determined to be of high or very high sensitivity for cultural resources as a result of the CDCA Plan inventory. Given the number of known sites in the sub-region and the low level of inventory it is likely that many more sites would be found along existing routes.

East Sierra, Fremont, North Searles and South Searles Subregions: These four sub-regions would retain existing route designations. A number of open routes within these sub-regions cross significant archaeological sites and are causing damage, sometimes severe, to the resources. The GIS database shows 15 sites that are bisected by open routes. These sites include eight large permanent or semi-permanent prehistoric occupation sites (villages) that are characterized by the presence of flaked stone tools, milling tools, fire-affected rock, hearths, and in some cases, house depressions and pottery sherds, and midden to a depth of more than 100 centimeters. Although none of these sites have been formally evaluated it is likely that all would be found eligible for listing in the National Register of Historic Places. Some of these sites are crossed by several routes and all of the site records indicate damage, usually severe. These sites occur in Ninemile Canyon, Grapevine Canyon, Sand Canyon, Indian Wells Canyon, Freeman Canyon, and the Little Lake area. It is highly likely that other such sites exist in these same canyons or other canyons on the Eastern Sierra front. Recent inventory of the Los Angeles Aqueduct and transmission line (in process) resulted in recordation of over 300 sites that have not yet been entered into the currently available database.

Recent inventory in the Searles Lake area has resulted in location of approximately 100 previously recorded sites, all prehistoric, but the data is still in preparation and is not available for current analysis. It does indicate the potential for very high site densities around Searles Lake.

Thirty-four sites fall within the 600-foot corridor open to parking and camping. This number includes those already listed as bisected by the routes. Many of the routes in use today follow historic routes and the impact to the historic routes has not often been formally assessed.

In many cases the historic routes have been obliterated by later use. About 100 miles of linear cultural resources (out of a total of 571 miles of linear cultural resources within the sub-region) match currently open routes.

Within the sub-regions, 36,013 acres within the four sub-regions have been identified as having high or very high sensitivity for cultural resources. Within these areas there are 284.3 miles of open route and 8908.54 acres of route corridor. Most of these routes have not been inventoried for cultural resources. Site densities from the California Desert Conservation Area Plan inventory averaged around 4.5 sites per square mile but are higher in some areas.

California Back Country Discovery Trail: Although routes identified for inclusion in the CBCDT have been incorporated into the West Mojave Plan, cultural resources inventory has not been carried out on the CBCDT as a whole within the Ridgecrest Field Office Area. Impacts from this trail cannot be assessed until the inventory has been conducted.

El Paso and Ridgecrest Subregions: Retention of the existing 1985-87 designations until completion of the El Paso Collaborative Access Planning Area process would continue existing impacts, in some cases severe, to properties listed in the National Register of Historic Places. The El Paso Mountains contain a 110-square-mile National Register district, the first listed National Register district in the California Desert, and a cultural resource ACEC.

The currently available GIS data shows five recorded National Register properties in the El Paso Mountains that are bisected by existing open routes of travel. These sites occur on routes EP-0155, 7101, 5146, 5151, 6231, 0238, 0421, 0471, and 0469. Some of the sites are bisected by or adjacent to more than one route. The five sites include a stone workshop/quarry with flakes, formed tools and groundstone; a temporary habitation/quarry/workshop with flakes, formed tools, millingstones, hearths, and a rock ring which is a possible dwelling foundation; a "large temporary campsite with pockets of midden exposed in the road", fire-affected rock (hearths), lithic scatter, and groundstone that is over 5000 meters square; and a temporary campsite with bedrock milling slicks, lithic scatter, and petroglyphs. One of these sites also contains historic mining materials. Most of the records for these sites indicate that presence of the route has caused damage to the site. Two additional sites containing midden, flake scatters, groundstone, and rock rings have recently been recorded inside the boundaries of the National Register district but have not been added to the GIS database. Existing open routes bisect both of these sites. At one of these sites erosion from vehicle tracks in the road is causing loss of soil and artifacts from the site. Routes, including EP-0226, 2143, and 4144, bisect several recorded sites in the vicinity of Sheep Spring, including two habitation sites with midden soils. The combination of high site densities and low inventory levels indicates that there are probably many more unrecorded sites that are bisected by routes.

GIS analysis identified 43 recorded archaeological sites that lie within the 600-foot corridor along open routes in which vehicle parking, camping, etc. are allowed. Nearly all of these sites are within the boundaries of the National Register district. Site densities from the CDCA Plan inventory averaged around four sites per square mile but are probably much higher

in some areas and may be much higher in general throughout the El Paso Mountains. One sensitivity polygon contains 143 recorded sites. One hundred eighty-six open routes fall partially or completely inside high and very high sensitivity polygons, which are primarily within the National Register district. Most of these routes have not been inventoried for cultural resources. There are 247.6 miles of open route and 10,808 acres of open route corridor inside high/very high cultural resource sensitivity polygons, almost all of which are inside the National Register district. There are 440.8 miles of open route in the El Paso sub-region. This means that of the 31,156.98 total acres within the El Paso sub-region, 24,157.1 acres fall within 300 feet of an open route and are therefore subject to impacts from use of open routes and adjacent areas. These figures make it highly probable that a great deal more damage is occurring to National Register properties than has been formally identified. The above analysis does not include effects to archaeological resources from vandalism, artifact theft, and other types of activities that tend to occur along vehicle access corridors but these activities have been a continual problem in the El Paso Mountains for decades.

4.2.5.3.2 Effects Of Networks: Barstow Field Office

The Barstow Field Office area includes nine subregions for route designation. Table U-1 in Appendix U lists the cultural resources potentially affected by proposed open routes. The following discussion summarizes those effects.

Afton Subregion: In the Afton Sub-region, nine routes intersect with several habitation sites, a village site, and the Mojave Road (SBR3033H/CHL963) a historic landmark.

Coyote Subregion: Approximately 84 routes intersect historic and prehistoric resources in this sub-region. Multiple lithic scatters, lithic reduction sites, stone alignments, road, lithic quarries, rock shelters (SBR7185, SBR2167), and habitation/cremations sites are present. There are also four significant sites, either historic landmarks or eligible for the National Register of Historic Places. These include the Mormon Trail (CHL577/SBR4411H), Boulder Transmission line (NRHP-E-SBR7694H), Borate-Calico Hills (CPHI-SBR54), and the Hoover Dam to Los Angeles transmission lines (NRHP-E-PSBR38H).

Bighorn Subregion: Three springs, rock art, pottery, habitation sites, and lithics characterize the cultural resources in this sub-region. Terrace Springs (SBR4038), Rattlesnake Spring (SBR4039), and a village near Old Woman Spring (SBR25) have open routes leading directly to them, and disturbance of cultural remains has occurred. Further degradation is likely should these route remain open. Sixteen routes intersect cultural resources in this region.

Granite Subregion: This sub-region contains various lithic scatters, lithic reduction sites, and trails. The most currently significant trail is the Mormon Trail (CHL577/SBR4411H). Additionally, the Boulder Dam to Los Angeles Power lines (NRHP-E-SBR7694H), a National Register eligible property, are found in this area. Twelve open routes intersect, or run parallel to, cultural resources in the sub-region.

Juniper Subregion: Bureau of Land Management records indicate that no known cultural resources are directly impacted by open routes of Alternative A.

Newberry-Rodman Subregion: Twenty-two routes were found to intersect or parallel a variety of cultural resources. Impacted sites include the Boulder Transmission lines 1, 2, 3 (SBR7694H), rock shelters, rock art, lithic quarries, mining sites, and historic graffiti.

Ord Subregion: There are rock art sites, lithic scatters, habitation sites, and historic graffiti located within this sub-region. Alternative A route maps show seven routes that intersect these cultural resources.

Sleeping Beauty Subregion: Three National Register eligible properties are found in the Sleeping Beauty sub-region, the Mojave Road (SBR3033H/CHL963), the Hoover Dam to Los Angeles transmission lines (NRHP-E-PSBR38H), and the ATS&F Railroad (NRHP-E-SBR6693H). Other cultural resources in this area include village sites, road, railroad grades, lithic quarries, and rock shelters. Thirty-one routes intersect these prehistoric and historic resources.

Superior Subregion: Approximately sixty-six Alternative A routes intersect a variety of rock art sites, lithic reduction, scatter, and quarry sites, historic mining sites, camps, and an airplane crash site (SBR800H). Several National Register eligible properties are located here, including the Goldstone Historic Mining District (NRHP-E-[80-5]), a lithic scatter/town site (NRHP-E-SBR4347/H), and a historic power transmission line (NRHP-E-PSBR39H).

Implementation of Route Network: Rehabilitation/reclamation of routes that are designated closed and maintenance of routes that are designated open would affect archaeological resources along those routes and should not be undertaken until cultural resources inventories and evaluations have taken place.

4.2.6 Mojave River Wild and Scenic River Eligibility Determination

Determination of eligibility for portions of the Mojave River to be designated as a Recreational River under the Wild and Scenic Rivers legislation would have no adverse environmental impact and is insignificant under CEQA. The eligibility would not alter any existing land use or recreational activities on public lands where it applies. The ultimate designation would require that future BLM projects in the river reach between Manix and Basin Road, including Afton Canyon, be compatible with provisions of the law. Inclusion in the National Wild and Scenic Rivers System requires Congressional action, accompanied by additional environmental review.

4.2.7 Cumulative Impacts

Air Quality: There could be a slight increase in particulate emissions from private lands, and reductions in emissions of particulate matter from public lands. This would result in corresponding declines in PM_{10} concentrations in a number of areas. On an overall plan basis, there would be a significant reduction in particulate emissions. A goal of Alternative A is to streamline procedures for development on private lands. This could result in an increased development rate in the short term. In the long term, other factors would control development and expected emissions from development would be nearly the same with or without Alternative A. Long term projected growth and emission increases would occur in and around current core population centers such as the Antelope Valley, the Victor Valley area and Barstow. Reductions would occur on BLM lands away from population centers.

Biological Resources: Alternatives A through E vary in the amount of new conservation within DWMAs, ACECs, and Conservation Areas from 1.20 million acres (19.8% of the undisturbed lands) to 1.79 million acres (29.4%) in Alternative C. These new conservation areas add to the existing 1.15 million acres (18.4%) and achieve much greater protection of desert tortoise habitat. For the primary communities of this habitat, creosote bush scrub and saltbush scrub, the increase in habitat conservation is 23-34%. The proportional increase is similar for the Mohave ground squirrel.

In addition to increasing the quantity of habitat conserved, the Plan focuses on protecting the highest quality tortoise and ground squirrel habitat, as defined by highest sign counts and live tortoises and persistent capture locations for the Mohave ground squirrel. The alternatives incorporating private land conservation (A, C, D, E) create large habitat blocks capable of sustaining ecosystem processes, landform diversity, all trophic levels and populations large enough to be viable in the face of fluctuations caused by the extreme desert environment. For the desert tortoise, maintenance of conserved habitat with a high carrying capacity is necessary for recovery after the disease runs its course or a cure is found, and after raven predation is reduced.

The West Mojave Plan's proposal to establish four tortoise DWMAs is consistent with the approach taken elsewhere in the listed range of the desert tortoise. It implements the tortoise Recovery Plan's recommendation that up to four tortoise DWMAs be established in the West Mojave Recovery Unit, and is consistent with the establishment of 11 tortoise DWMAs by the BLM's NEMO and NECO plans and by local government plans adopted in southern Utah and Clark County, Nevada. Redesignation of Class M lands to Class L within the tortoise DWMAs is also consistent with the approach taken by the BLM in its NECO and NEMO plans. County general plans are also intended to be consistent with Alternative A and its establishment of DWMAs, if the alternative is adopted. As a result, from a regional perspective, the West Mojave Plan's tortoise conservation strategy would be consistent with all applicable federal and local government plans.

The Plan presents cumulative impacts, both positive and negative to most of the covered species. The beneficial cumulative impacts include the establishment of large, unfragmented

habitat blocks, measures to reduce tortoise mortality, measures to minimize disturbance impacts to conserved lands and measures addressing unique components of diversity, such as endemic species, disjuncts and habitat specialists. The provision of incidental take areas where permitting is streamlined accommodates development of large acreages of urbanizing lands and degraded habitat. The developed lands put increasing pressure on the conserved lands, from resource extraction, incidental land uses such as utilities and from recreation. The allowable loss of habitat (the ITA) exceeds conservation in all alternatives. However, most of the habitat in the ITA is no longer occupied by the covered species, and the development projections do not indicate substantial future ground disturbance in the more remote areas away from the cities where the best habitat remains outside the HCA.

Cumulatively the habitat loss within the ITA would reduce populations of many common species in a very substantial way. As long as the covered species, which are the rarest, most vulnerable or those with known declines, are adequately conserved in the Habitat Conservation Area, the cumulative impact would not be significant or adverse. The more common species would survive within the HCA and are present in abundance outside the West Mojave as well.

Although large acreages are available as incidental take areas, not all of these lands would be developed or even disturbed during the term of the Plan. The growth projections for urban development can be accommodated on a small fraction of the land outside the HCA. Many areas without water, utilities, or easy access would remain undeveloped, even from rural residences. They are also available for future recreation areas and for developments such as mining or energy production that can be pursued in remote areas. The allocation of lands for different uses achieved by the West Mojave Plan should not be considered as the final determination of land use for the planning area. It is rather a dynamic process of utilizing the best available science and land use planning to achieve conservation of the species and communities known to be in jeopardy. Technologies of the future can and are expected to alter provisions of the Plan to improve upon the implementation of its objectives.

Overall, however, ACEC management of tortoise DWMAs would constitute a significant beneficial impact relative to BLM management under the current habitat classification. It would augment and refine protection ostensibly provided by the critical habitat designation. ACEC prescriptions would serve as specified management actions that are much more protective than class guidelines given in the CDCA Plan. Specified prescriptions would strengthen protection in places where the BLM Class M and unclassified public lands guidelines would fail to do so.

When placed in context of other developments within the West Mojave, including increased land development, mining and increased recreational use of habitat lands, the reduction in surface disturbance by the elimination of unnecessary and parallel routes and those impacting vehicle-sensitive species would be beneficial and an improvement over the existing situation (the No Action Alternative). This is because larger blocks of relatively undisturbed habitat would be available, creating a lesser chance of vehicle collision, a reduced disturbance factor, and less fragmentation.

In the context of the entire Mojave Desert, the Habitat Conservation Area in the West Mojave Plan connects to public lands in the Inyo, Sequoia, Angeles and San Bernardino National Forests. New conservation near the latter two Forests includes the linkage to the Poppy Preserve, the Big Rock Creek Conservation Area, and the Carbonate Endemic Plants ACEC. The linkages within Los Angeles County would prevent future isolation of the Poppy Preserve and Saddleback Buttes State Park.

The HCA as designed would link the Pinto DWMA to Joshua Tree National Park, creating a larger block of protected habitat for the desert tortoise. It would also create a protected area for the Mojave fringe-toed lizard north of JTNP that is contiguous with the Park. The MGS Conservation Area links to Death Valley National Park on the southeast corner of Owens Lake and is nearly adjacent north of the Mojave B Range of China Lake NAWS. Connectivity to the Mojave National Preserve is via remote BLM lands near the Cronese Lakes, but is not a linkage of the HCA. This area between Death Valley National Park and Mojave National Preserve is linked to BLM's Northern and Eastern Mojave Plan.

The West Mojave Plan adjoins the Coachella Valley Multiple Species Habitat Conservation Plan near Morongo Valley, and land uses in this area are compatible with both habitat linkages and protection of species in common to the two plans (triple-ribbed milkvetch and Little San Bernardino Mountains gilia).

Map 1-2 illustrates the regional connectivity of all major land use plans in the southern California area.

Expansion of Fort Irwin: As stated in Table 4-1, the impact analysis included in Chapter 4 assumed that lands transferred by Congress from BLM to Army in December 2001 would be utilized for military training. (It should be noted that a separate NEPA and Section 7 process, currently being undertaken by the Army, is addressing mitigation of those impacts and compliance with the federal endangered species act.) Accordingly, the cumulative regional effects of military training in the expansion area and implementation of the West Mojave Plan were incorporated directly into and throughout the impact analysis presented in preceding Chapter 4 discussions.

Livestock Grazing: Several actions would contribute to an overall loss of land designated for livestock grazing that the BLM administers:

- *Fort Irwin Expansion:* The Fort Irwin expansion includes part or all of the Goldstone (100% or 9,726 acres), Superior Valley (42% or 69,328 acres), and Cronese Lake (<10% or 4,200 acres) allotments. Fort Irwin does not authorize grazing. The Goldstone allotment would be entirely unavailable for grazing and the portions of the Superior Valley and Cronese Lake allotment located on Fort Irwin would be unavailable for grazing. This would represent a total loss of approximately 83,254 acres of public land designated for livestock grazing.

- *Voluntary Relinquishment:* At this time there are no known permittees or lessees that are considering relinquishing their allotments. If in the future permittees or lessees do start to relinquish their allotments there may be a significant reduction in the livestock grazing available on public land administered by the BLM.

- *Loss Of Ephemeral Sheep Grazing Due To DWMA's Boundaries:* Allotments located entirely within DWMA's, including Gravel hills (130,075 acres), Superior Valley (the remainder or 95,738 acres), Buckhorn Canyon (12,364 acres), and Pilot Knob (37,857 acres). Portions of allotments located in DWMA's, including Shadow Mountain (80% or 41,806 acres), and the Stoddard Mountain West Unit (63,889 acres). Portions of the Cantil Common, Monolith-Cantil, Lave Mountain allotment that are not within a DWMA, but that would face a possible loss of grazing due to the DWMA boundary location.

The cumulative effects of Alternative A would reduce the size of the portion of the livestock industry centered on the use of BLM administered lands in the California Desert Conservation Area by approximately 465,871 acres.

Minerals: Alternative A, with about 50,000 acres proposed for withdrawal, coupled with the 1994 California Desert Protection Act (CDPA) and the withdrawal of nearly 45,000 acres for the San Bernardino National Forest (NF) in 2001would have at least a slight negative impact on mineral development. The CDPA placed known deposits and large areas of mineral potential into wilderness and parks. All of these actions reduce the availability of mineral deposits, for example clay, and potentially, aggregate deposits in the Oro Grande/ Brisbane Valley area and limestone at the transition between Lucerne Valley and the San Bernardino Mountains. When deposits, or large portions of deposits, such as Opah Ditch are placed off limits to mining (CDPA) or given ACEC protective status, it hastens the depletion of other deposits and increases highway construction costs. Increased costs for maintaining state and federal highways comes not only from increased hauling distances but from increased costs of the aggregate itself as deposits on government land are no longer available, requiring that royalties be paid to private owners.

On a regional scale, the contribution to cumulative effects from this alternative would probably be minor. On a local scale, the effects of the withdrawal may have a noticeable negative effect on the local industry and economy.

Recreation: No significant cumulative impacts are expected. This is due to both the sheer size of the planning area and the many recreational opportunities it provides, and the effectiveness of the design of the route network, which meets the needs of foreseeable commercial and recreational motorized access. Some cumulative effects will occur, however. These would include the following:

- Recreational four-wheel drive and motorcycle use would shift from areas identified as having higher than average densities of desert tortoise sign to those area identified as having less than average or no desert tortoise sign. These shifts would generally be to

more mountainous or steeper terrain within the planning area. For example, the closure of motorized routes in the flatter bajadas and wash terrain of the El Mirage, Kramer, Fremont and Superior sub regions would shift such use to the more mountainous portions of those sub regions where more motorized routes were retained. As a result those areas are likely to see greater recreational use.

- Although many motorized touring routes have been retained in the flatter terrain, those visitors who enjoy this type of experience may find their recreational opportunities somewhat limited within the DWMAs. They may shift their recreational activities to the OHV open areas that have flatter terrain, such as Stoddard and Johnson Valleys. As a result, use of these areas may increase. Low relief areas that are outside of the DWMAs may also see increased motorized vehicle use.

- Lands north and east of the Superior sub region are among those lands transferred by Congress to Fort Irwin. Should this area no longer be available for motorized vehicle recreation, this loss of recreation opportunity, together with the rapidly growing Southern California population and the anticipated continued growth in motorized recreation, would displace some visitors onto the smaller remaining BLM land base. Use of western Superior Valley was never particularly high, so the scale of the displacement would be small, but these lands, being removed from major highways and population centers, did offer a remote recreation experience that would no longer be available.

- Although a variety of routes and terrain are afforded by the route system proposed under this alternative, the opportunity to have a "remote experience" is expected to become increasingly difficult during the term of the plan. The cumulative effect of this is likely to be a displacement of those visitors seeking a remote experience, leading them increasingly to visit locations within adjoining, but more remote regions such as the NEMO and NECO planning areas. The scale of this "spillover" is expected to be relatively small, and should not affect the ability of visitors to enjoy a "remote experience" in these areas during the term of the West Mojave Plan.

The West Mojave Plan's route network is one of six that are being implemented within the BLM's California Desert Conservation Area. Four networks were adopted within the last two years for the NEMO DWMAs, the NECO plan, the Coachella Valley Plan, and the Western Colorado Desert (WEC)). A fifth network is currently underdevelopment, and will address lands within the NEMO planning area that are located outside of tortoise DWMAs. Collectively, these six networks would make 13,134 miles of open routes available for motorized vehicle access and recreation within the CDCA, of which 5,098 miles, or 39 percent, would be within the Western Mojave Desert. Table 4-45a presents a summary of route mileages for these plans.

Table 4-45a
Summary of CDCA Route Network Mileages

PLAN NAME	PLAN STATUS	OPEN ROUTE MILES	LIMITED ROUTE MILES	CLOSED ROUTE MILES	PUBLIC LANDS
NECO	ROD 12/20/02	4,739	4	239	3,800,000
NEMO DWMAs	ROD 12/20/02	651	66	70	300,000
NEMO outside DWMAs	Ongoing	1,527	32	128	2,400,000
WECO	DR 01/31/03	1,116	279	922	475,000
West Mojave Routes	DR 06/30/03	5,054	51	2,391	3,200,000
Coachella Valley Plan Amendment	ROD 12/27/02	47	0	71	200,000
TOTAL		13,134	432	3,821	10,375,000

DR = Decision Record, ROD = Record of Decision

The West Mojave Plan's public land base is approximately 31% of the public lands located within the CDCA. Its percentage of total routes is somewhat higher than this: 43.1%. Following adoption of all these planning efforts, approximately 37.6% of the CDCA's open routes would be located in the West Mojave planning area. Approximately 60.6% of route closures would occur within the western Mojave Desert. These figures reflect the much higher historic usage of West Mojave public lands, due primarily to their location immediately adjacent to the Los Angeles metropolitan area and the rapidly urbanizing Antelope and Victor Valleys, and the continuing urban interface issues that affect the planning area.

The West Mojave route network has been designed, however, to provide access to recreation venues identified by field surveys and to meet commercial and other access needs, in a manner compatible with sensitive species conservation; see preceding discussions in this chapter. Field surveys confirm that all routes actually exist on the ground, an important improvement over the network temporarily adopted following "Interim" closures imposed in 2001 (prior to completion of field surveys): approximately 9 percent of the "Interim" routes do not, in fact, exist on the ground. "Interim" closures were imposed prior to the identification, by field surveys, of the precise locations of recreation venues and other motorized access needs. By contrast, the designers of the June 30, 2003 network had this field information in hand, as well as more current biological data, and were able to address access and species needs more effectively.

The West Mojave network would to connect seamlessly with the adjacent NEMO, NECO and Forest Service networks, so the regional network of motorized vehicle access routes is projected to function as an effective whole. Although some spillover into adjacent NEMO and NECO lands is possible the scale of this is expected to be relatively small (see above). As a result, cumulative impacts on recreation and motorized access needs would be minor.

Cultural Resources: Cumulative public land impacts to cultural resources that would otherwise be significant would be mitigated through the Section 106 process. A programmatic approach to Section 106 compliance for BLM routes of travel within this planning area is being discussed with the California State Office of Historic Preservation. The total number of prehistoric/historic sites that are being affected by the open route network is unknown. Most of these sites are being affected by routes designated during the 1985-87 route designation process, so the impacts have been occurring for a very long period of time. Since these routes would remain as open routes over much of planning area the impacts would occur under West Mojave Plan implementation. The total number of sites subject to adverse effects along vehicle corridors is also unknown but certainly numbers in the hundreds, perhaps thousands, of sites. Cultural resources are a finite and non-renewable resource so loss of the information they contain is a permanent loss for which there is no mitigation, restoration, or rehabilitation. The loss is irrevocable. Opportunities for the public to view these sites in their natural surroundings and to experience the sense of exploration, adventure, and understanding that comes with observing them *in situ* are permanently lost. Our ability to provide educational and interpretive opportunities is decreased with the loss of each site or portion thereof. Prehistoric sites are repositories of cultural information about people who lived here into the far distant past and are of very great value and concern to Native American people today. Continued destruction removes pieces of our past on a daily basis.

4.3 ALTERNATIVE B: BLM ONLY

Impacts would be as described for Alternative A, except as discussed below.

4.3.1 Air Quality, Soils and Water

Air Quality: Impacts would be the same as described above for Alternative A, except as specifically noted below. Table 4-46 describes impacts that would result from the implementation of Alternative B.

Table 4-46
Air Quality Impacts – Alternative B

ACTIVITY	POLLU-TANT	CHANGE	MAGNITUDE	TIME SCALE	LOCATION	NOTES
Private land development	PM_{10}	None	None			Does not apply to private lands
	Ozone precursors	None	None			Does not apply to private land
Paved roads	PM_{10}	Increase	Slight	Short & long term	Within DWMAs on BLM only	Could eliminate paving as dust control measure on unsurfaced roads
Allowable ground disturbance	PM_{10}	Increase	Up to 1% from source[1] Unknown potential increase on Private lands	Long term	Within West Mojave area	Increased ground disturbance and bare ground would emit additional PM_{10} Would be no limit on PVT. lands
Restoration of existing disturbances	PM_{10}	Increase	Slight (less than alt. A)	Short term	On BLM land only.	Ground disturbance and bare ground would initially emit PM_{10}. Sites would stabilize within 1-2 years.
	PM_{10}	Decrease	Slight (less than alt. A)	Long term		

Notes: 1. MDAQMD inventory of sources showed nearly 8% of PM_{10} emissions from construction and bare ground in 1990.

Cumulative Impacts on Air Quality From Alternative B: There would be reductions in emissions of particulate matter from BLM managed lands. This would result in corresponding declines in PM_{10} concentrations in a number of areas. On an overall plan basis, there would be a significant reduction in particulate emissions. Reductions would occur on BLM lands away from population centers.

Significance: There would be a significant reduction in PM_{10} emissions as a result of Alternative "B". These reductions would be larger than Alternative A.

Conformity Analysis and Conclusion: Alternative B results in significant reductions of PM_{10} emissions. All SIP requirements for the five federal PM_{10} nonattainment/ maintenance areas are met by the alternative for PM_{10}. All emission levels are below deminimus levels, so no further conformity analysis is necessary and a formal conformity determination is not required.

4.3.2 Biological Resources

4.3.2.1 Natural Communities

Because of the complex public and private ownership pattern within the West Mojave, conservation of natural communities under Alternative B would vary considerably from that of Alternatives A, C, D, E and F, where private lands are contributing to the HCA. The acreage of each natural community that is protected by Alternative B is presented in Table 4-47.

Conservation measures on BLM lands would conserve a large and representative example of the two primary plant communities, creosote bush scrub and saltbush scrub, though these would be fragmented by the checkerboard ownership pattern within the Fremont-Kramer and Superior-Cronese DWMAs. More consolidated blocks of these communities would be present in the Ord-Rodman and Pinto DWMAs and the MGS conservation area in Kern and Inyo counties. Within the DWMAs, taking no action on route designation would subject the existing large blocks of creosote bush scrub and saltbush scrub communities to fragmentation over time, although the magnitude of these impacts from use of dirt paths and roads is unknown. In addition, without route designation on public lands, gradual degradation of these natural communities would proceed without restraint. Desert playas and desert washes are also vulnerable to increasing degradation from vehicular use.

Plant communities found at the western boundary of the planning area, in the transition between the mountains and the desert, would be conserved along the eastern Sierra Nevada mountains, but would have only minimal conservation in the San Gabriel and San Bernardino Mountains foothills. These communities are different forms of chaparral, pinyon and juniper woodlands, Mojave mixed woody scrub and Joshua tree woodland.

Many of the rare plant communities would only be conserved in selected locations under Alternative B, and others would have no assured conservation. Riparian scrub and riparian forest in the Mojave River would not be protected except at Camp Cady, Afton Canyon and in existing county parks (i.e. Mojave Narrows Regional Park). Isolated wetlands, as at Big Morongo Canyon, the palm oases in Joshua Tree National Park, and the eastern Sierra canyons would remain conserved by BLM and NPS management. Other rare communities, including alkali wetlands and remnant native grasslands would have no pro-active conservation program.

Impacts to the rare natural communities would depend on the location of future development on private land and on the ability of the local jurisdictions to provide conservation. Existing wetland protection laws would probably conserve the majority of the riparian communities, but the alkali seeps, springs, and meadows may not be conserved because of changes in the laws governing isolated wetlands. On public lands, BLM would regulate the placement of new facilities and construction in order to protect unusual natural communities and wildlife habitats. Existing route designations would probably adequately protect the limited wetland communities on public land.

Table 4-47
West Mojave Natural Communities Impacted by Alternative B (In Acres and %)

NATURAL COMMUNITY	TOTAL ACREAGE	EXISTING CONSERVATION		NEW CONSERVATION		TOTAL CONSERVATION		POTENTIAL LOSS	
Alkali seep	59	0		0		0		59	(100)
Alkali sink scrub	10,895	1,014	(9.3)	2,420	(22.2)	3,434	(31.5)	7,461	(68.5)
Big sagebrush scrub	9,601	8,108	(84.5)	852	(8.9)	8,960	(93.3)	641	(6.7)
Blackbush scrub	132,603	87,343	(65.9)	0		87,343	(65.9)	45,260	(34.1)
Chamise chaparral	28,593	0		0		0		28,593	(100)
Cottonwood-willow riparian forest	11,533	6,793	(58.9)	0		6,793	(58.9)	4,740	(41.9)
Creosote bush scrub	4,025,617	409,400	(10.2)	930,684	(23.1)	1,389,688	(34.5)	2,635,929	(65.5)
Desert holly scrub	21,716	2,190	(10.1)	16,663	(76.7)	18,852	(86.8)	2,864	(13.2)
Desert wash scrub	34,496	4,902	(14.2)	1,746	(5.1)	6,648	(19.3)	27,847	(80.7)
Fan palm oasis	33	0		0		0		33	(100)
Freshwater seep	388	0		0		0		388	(100)
Gray pine-oak woodland	2,678	49	(1.8)	0		49	(1.8)	2,629	(98.2)
Greasewood scrub	3,662	0		1,938	(52.9)	1,938	(52.9)	1,724	(47.1)
Hopsage scrub	6	5	(83.3)	1	(16.7)	6	(100)	0	
Interior live oak woodland	589	0		0		0		589	(100)
Jeffrey pine forest	1,811	1,811	(100)	0		1,811	(100)	0	
Joshua tree woodland	10,383	4,763	(45.9)	0		4,763	(45.9)	5620	(54.1)
Juniper woodland	87,167	6,960	(8.0)	0		6,960	(8.0)	80,207	(92.0
Mesquite bosque	7,110	2,491	(35.0)	805	(11.3)	3,296	(46.4)	3814	(53.6)
Mojave mixed woody scrub	689,589	378,795	(54.9)	74,243	(10.8)	453,037	(65.7)	236,551	(34.3)
Mojave riparian forest	4,687	28	(0.6)	0		28	(0.6)	4,659	(99.4)
Montane meadow	966	0		0		0		966	(100)
Montane riparian scrub	2,228	203	(9.1)	236	(10.6)	439	(19.7)	1,789	(80.3)
Native grassland	3,375	0		0		0		3,375	(100)
Northern mixed chaparral	992	992	(100)	0		992	(100)	0	
Pinyon pine woodland	18,773	12,077	(64.3)	593	(3.2)	12,670	(67.5)	6,102	(32.5)
Pinyon-juniper woodland	158,329	84,581	(53.4)	8,668	(5.5)	93,249	(58.9)	65,081	(41.4)
Rabbitbrush scrub	7,842	92	(1.2)	0		92	(1.2)	7,750	(98.8)
Scrub oak chaparral	36,385	23,106	(63.5)	0		23,106	(63.5)	13,279	(36.5)
Saltbush scrub	591,713	18,897	(3.2)	130,967	(22.1)	149,864	(25.3)	442,049	(74.7)
Semi-desert chaparral	128,230	3,855	(3.0)	0		3,855	(3.0)	124,376	(97.0)
Shadscale scrub	38,602	7,194	(18.6)	31,320	(81.1)	38,514	(99.8)	88	(0.2)
TOTAL	6,070,651	1,115,253	(18.4)	1,201,136	(19.8)	2,316,389	(38.2)	3,754,262	(61.8)

The table excludes acreage in the GIS database describing landforms (lava, lakes, playas), disturbed lands (agriculture, urban) and disturbed plant communities (non-native grassland, ruderal).

Total in area excludes military lands.

Existing conservation includes ACECs, Wilderness, National Parks, State Parks, CDFG Ecological Reserves.

New conservation includes the HCA for this alternative. Los Angeles County SEAs are excluded.

Potential loss includes areas not under specific conservation and available for development or other use. Actual loss of these communities is dependent on location, development trends and land ownership.

4.3.2.2 Desert Tortoise

Excepting minor differences, Alternative B shares the same benefits and residual impacts associated with Alternative A for the following categories, which for the most part, are not reiterated in Table 4-48: Establish DWMAs, Land Management Within DWMAs, Land Management Adjacent to DWMAs, Size Relative to the Existing Tortoise ACEC, BLM ACEC Management, Agriculture, Commercial Filming, Drought, Energy & Mineral Development, Cattle Grazing, Sheep Grazing, Head Starting, and Motorized Vehicle Access Network.

Table 4-48
Tortoise Impacts of Alternative B

BENEFITS	RESIDUAL IMPACTS
DWMA DESIGNATION AND CONFIGURATION	
Establish DWMAs • Would establish *four* DWMAs, including 1,595 mi^2 of public lands, which would have many of the benefits described above for Alternative A	Establish DWMAs • A total of 664 mi^2 of private land would physically be located within DWMAs but not managed for tortoise conservation, as would occur on public lands; both direct and indirect impacts are likely to be much more adverse and widespread • DWMA configuration is based on Alternative A, excluding private lands; no public lands outside DWMAs have been added to minimize the effects of providing for conservation on a substantially smaller DWMA land base.
Recent and Current Tortoise Occurrence **Includes**: • 1,595 mi^2 (14% of the 2002 range) within *four* DWMAs • Good representation in central part of 2002 range, but inferior to Alternative A due to lack of private land • 291 mi^2 (52%) of higher density areas • 243 of 424 (57%) tortoises • 1,481 mi^2 of USFWS critical habitat • 856 mi^2 of BLM Category I (96%) and 317 mi^2 of Category II (87%) habitats	Recent and Current Tortoise Occurrence **Does not include**: • 9,539 mi^2 (86%) of the 2002 range • Poor representation in periphery of range, and fails to include essential habitats on private land • 272 mi^2 (48%) of higher density areas • 181 of 424 (43%) tortoises • 90 mi^2 of USFWS critical habitat • 38 mi^2 of BLM Category I (4%) and 47 mi^2 of Category II (13%) habitats
Land Management Within DWMAs • Would establish context for implementing conservation measures in DWMAs, which would provide for consistent, more efficacious conservation on public lands • Presence-absence surveys would continue to be required on all public lands in and out of DWMAs, and clearance surveys conducted as authorized by section 7 on a case-by-case basis, which have proven effective at minimizing impacts thus far	Land Management Within DWMAs • Tortoises would continue to be significantly impacted on private lands inside and outside DWMAs without consistent protection, conservation or compensation • Would fail to provide for programmatic clearance of tortoises from impact areas on private lands, which would result in existing failure to adequately minimize impacts

BENEFITS	RESIDUAL IMPACTS
Land Management Adjacent to DWMAs • BLM would be ideally situated to minimize impacts of adjacent vehicle open areas on DWMAs (although those impacts would continue to occur on private lands) • DWMA locations would provide for mutual benefits to BLM, military (Edwards AFB and China Lake), and Joshua Tree National Park (Pinto Mtn.)	Land Management Adjacent to DWMAs • SRAs would not be established, which would lead to protection on a case by case basis and perpetuate existing problems
BLM Management of Category I, II, & III Habitat • Habitat categories would remain unchanged in DWMAs	BLM Management of Category I, II, & III Habitat • Existing Category I (38 mi^2) & II (47 mi^2) habitats on public land outside DWMAs would be changed to Category III, which could constitute a significant impact[10]
Plan Implementation • Milestones would be identified for implementing measures, which would result in timely implementation or withdrawal of take authorization • Conservation management would still be facilitated on public lands (see Alternative A), but the efficacy of a region-wide strategy would be significantly undermined without private land involvement	Plan Implementation • BLM would not be signatory to an Implementing Agreement, which would provide for significantly less coordination and protection on public and private lands in DWMAs • An Implementation Team would not be created to oversee conservation on private and public lands • There would be no consistent region-wide approach, which would undermine conservation in DWMAs on public lands (increase of indirect impacts) and provide for no minimization of direct impacts on private lands • The incentive to ensure conservation on public lands in exchange for incidental take on private lands would be lost
Federal Permitting • Same as Alternative A for public lands	Federal Permitting • Would not result in issuance of programmatic Section 10(a) take authorization on private lands, which would perpetuate existing problems that have resulted in minimal benefit to tortoises, although lost habitat would be compensated • Would fail to implement standard BMPs on private lands and result in implementation of measures developed on a case-by-case basis that, due to their variable nature, would be less effective at protecting tortoises
State Permitting • Not Applicable; even so, CDFG often (but not always) requires enhancement and endowment funds for BLM-authorized projects	State Permitting • Would perpetuate existing problems associated with issuing 2081 permits on a case-by-case basis, increasing the possibility of inconsistent and less effective minimization and mitigation standards

[10] The proposal to convert non-DWMA Category I & II habitats to Category III was derived in the context of Alternative A, where both public and private lands were included in proposed DWMAs. This alternative would still result in the conversion of Category I & II habitats, but without 664 mi^2 of private land in DWMAs. Conversion of 85 mi^2 of Category I and II habitats would result in less compensation under the MOG formula (compensation would be 1:1 rather than 2:1 or 6:1 in Category I & II), replace relatively protective goals (maintaining and/or increasing stable, viable populations in Category I & II) with less protective ones (limit declines through mitigation in Category III), etc. In this context, the conversion to Category III would be unjustified and could result in significant impacts to the conservation function of this alternative.

BENEFITS	RESIDUAL IMPACTS
	• Would perpetuate inconsistent approach of applying CDFG enhancement and endowment funds (or not) on BLM-authorized projects
Compensation & Fee Structure • In some locations, would provide for the highest compensation ratio of any alternative (i.e., up to 6:1 acres), although most projects are compensated at a ratio of between 2:1 and 4:1 • Compensation would be somewhat commensurate with the severity of impact, as all lands outside DWMAs would be designated as Category III Habitat (1:1 compensation ratio), and relatively higher compensation fees would still be collected in DWMAs	Compensation & Fee Structure •1991 MOG formula would be used for habitat compensation, which would perpetuate ineffectual take avoidance and uncoordinated management on acquired lands • Compensation would be determined on a case-by-case basis, which has thus far resulted in only nine Section 10(a) permits, an approach which has not effectively minimized impacts • BLM's funding sources would not be supplemented by compensation fees collected for private land development; single-family residences would be constructed on private lands in DWMAs without fee collection; reduced fee collection could affect the BLM's ability to implement measures and acquire lands • Compensation would occur for only those projects where tortoise sign was found, which fails to minimize indirect impacts that would be alleviated by collecting fees in ½:1 and 1:1 compensation areas, even where tortoise sign was not found; perpetuates current problems
1% ALLOWABLE GROUND DISTURBANCE	
1% Allowable Ground Disturbance • 1% AGD would be the same on public lands as Alternative A, and would significantly minimize the amount of habitat available for authorized take in DWMAs	1% Allowable Ground Disturbance • Would fail to limit authorized take on private lands, resulting in direct impacts to private lands and indirect impacts to adjacent public lands in DWMAs • Rather than 4,500 acres available for authorized take on private lands, 450,000 acres would be available, which would constitute a significant impact and perpetuate existing problems

BENEFITS	RESIDUAL IMPACTS
PRIVATE LAND ACQUISITION AND PUBLIC LAND DISPOSAL	
• Land acquisition would continue on a case-by-case basis, which provides some (minimal) benefit at a very slow rate • Public lands within DWMAs would not be available for disposal, which would ensure that they are either retained or consolidated to promote conservation	• Would perpetuate variable and inconsistent land acquisition programs, which rely on discretion (and limited understanding) of proponents[11] • Would fail to augment BLM's existing acquisition program, since fees would not be collected on private land; would detract from BLM's ability to manage programs (i.e., motorized vehicle access, law enforcement, fencing, etc.) enhanced by consolidated public ownership • May facilitate mineral development on newly acquired lands, as described in Alternative A
CONSTRUCTION ACTIVITIES	
Construction • In this table, other sections address fee structure and compensation, and land management within DWMAs; otherwise same as Alternative A, which would result in less authorized take, as private lands are not included	Construction • Would fail to regulate new construction on private lands, which would perpetuate existing problems
EDUCATION PROGRAM	
Education • Although an education subcontractor would not be employed, BLM would increase education outreach for users in open areas to garner public cooperation, minimize impacts in adjacent DWMAs, reduce amount of vandalism to newly installed fences. BLM would provide maps of approved routes and other materials to enhance motorized vehicle access; new brochures for filming and dual sports.	Education • Would fail to employ an education subcontractor, which would seriously undermine outreach to schools, enhancement of existing private programs (e.g., as at San Bernardino County Museum, provided for by DTPC, etc.), and provision of consistent awareness programs for construction workers.
FERAL DOG MANAGEMENT	
Feral Dog Management • Same as Alternative A	Feral Dog Management • A Feral Dog Management Plan would not be developed or implemented on private lands, so impacts would continue unabated, particularly in the vicinity of urbanizing areas adjacent to DWMAs (e.g., Barstow, California City, Lucerne Valley, Twentynine Palms, Yucca Valley)

[11] In the early 1990's, one proponent attempted to transfer 40 acres of private land in the San Joaquin Valley to the Barstow office of the BLM to compensate for section 7-authorized impacts in 29 Palms. Although this is an extreme example, current management results in word-of-mouth approaches to acquiring land and identifying the responsible management agency (mostly BLM and DTPC, but up to the discretion of the proponent when impacts are on private lands)

BENEFITS	RESIDUAL IMPACTS
FIRE MANAGEMENT	
Fire Management	Fire Management • Fails to incorporate new information (e.g., DWMA configuration, higher density areas) that would have further minimized impacts of fire fighting activities in DWMAs
GUZZLERS	
Guzzlers • Same as Alternative A	Guzzlers • Without involvement of counties and cities, would not provide for the studies and remedial actions identified in Alternative A, since guzzlers were installed by CDFG and are not otherwise managed by BLM
HABITAT CREDIT COMPONENT	
Habitat Credit Component • Effectively remain the same as Alternative A since all candidate restoration sites would be on public lands in DWMAs	Habitat Credit Component • The Habitat Credit Component program was conceived for Alternative A, where private lands would be included; using this program on public lands only would increase impacts discussed in Alternative A due to the relatively small DWMA size
LAW ENFORCEMENT	
Law Enforcement • Increased law enforcement and outreach (recreational technicians) would occur and be focused on public lands in DWMAs, which would be the primary means of minimizing impacts in DWMAs and essential to facilitate success of most programs	Law Enforcement • Increased BLM enforcement would not protect tortoises and regulate uses on private lands

BENEFITS	RESIDUAL IMPACTS
RAVEN MANAGEMENT	
Raven Management • Pertinent components of the raven management plan would be implemented on public lands	Raven Management • Prescriptions would not be implemented on private lands, which would significantly detract from the intended function of the program • Would allow for new landfills on private lands within five miles of DWMAs, which could result in significant impacts depending on the locations relative to DWMAs • Would not allow for direct contributions from participating utilities, so that programmatic salvage permits and other programs would fail to minimize raven impacts
TRANSPORTATION	
Transportation • Same as Alternative A	Transportation • Without the participation of Caltrans and county road departments, there would be no coordinated highway fencing program; fences would still be installed as new roads are widened (in 10 to 15 years), but tortoises would be impacted in the interim, particularly along Highway 395, south of Kramer Junction • Road maintenance (seasonal restrictions, roadbed/berm requirements, etc.) would be restricted to BLM activities on public lands, which would fail to effectively protect tortoises since most known mortality occurs along paved roads maintained by counties and Caltrans
UTILITIES	
Utilities • Same as Alternative A	Utilities • See comments under Raven Management, above • Would fail to implement programs designed for construction, maintenance, and operation (particularly water districts) on private lands

Alternative B would result in substantial benefits on public lands in DWMAs, as identified in the first column (and pertinent sections of Alternative A). However, the alternative does nothing to minimize or mitigate incidental take on private lands (inside or outside DWMAs); in fact, those problems would be perpetuated. This alternative would not address "spill-over" effects that would continue to impede BLM conservation management. Nor does it provide a single, consistent conservation strategy that could be implemented collaboratively by all agencies and jurisdictions within the western Mojave Desert. Failure to adequately minimize or mitigate impacts on private lands would handicap effective conservation and tortoise recovery on public lands. On a regional scale this would result in significant impacts and substantially undermine tortoise conservation.

4.3.2.3 Mohave Ground Squirrel

Alternative B is similar to Alternative A, in that it proposes a conservation strategy that would provide for MGS conservation in the MGS CA and the two DWMAs, but differs significantly in that it would only apply to public lands managed by the BLM.

Similar benefits and residual impacts given for the tortoise and/or MGS (mostly in Alternative A for the two species) would affect the following programs where the two species ranges coincide: Dump Removal and Waste Management; Education; Fire Management; Habitat Reclamation and Restoration; Land Acquisition; Mining; Signing and Fencing the Two DWMAs; Multiple Use Class Designations; Conservation Relative to Military Bases; Motorized Vehicle Access; Recreation (Competitive Events, Dual Sports, Hunting and Shooting, Parking and Camping); Transportation (Highway Fencing and Culverts); Utilities Construction and Maintenance; Commercial Filming and Plant Harvest; General and Focused Trapping Studies; and Monitoring.

Table 4-49 reports only those benefits and residual impacts as they relate to MGS conservation that are different from the impacts identified under Alternative B for the tortoise. As such, the programs listed above are not reiterated the table.

Table 4-49
Mohave Ground Squirrel Impacts of Alternative B

BENEFITS	RESIDUAL IMPACTS
Conservation Area Size of Conservation and Incidental Take Areas • (AB-1) The 2,693 mi^2 MGS CA would include 2,016 mi^2 of public lands (75% of the 2,693 mi^2 MGS CA).	Conservation Area Size of Conservation and Incidental Take Areas • Failure to include private lands managed by cities, counties, and other agencies other than the BLM would constitute a significant impact. There are a total of 567 mi^2 of private lands (21% of the 2,693 mi^2 MGS CA; the other 4% includes State land and miscellaneous ownerships) where take would be considered on a case-by-case basis. All such lands would ultimately be available for authorized development and likely undermine protection of large unfragmented blocks of habitat, which would be required for conservation of this species.

BENEFITS	RESIDUAL IMPACTS
Specified Conservation Areas Outside the MGS CA Los Angeles County Significant Ecological Area • The WMP would not officially adopt the heightened review associated with SEA TAC; this would not constitute a significant impact, as the SEA TAC would continue to function to review projects and require 2081 permits for the MGS, where appropriate Sierra Foothills Habitat Connector • Failure to include Los Angeles County's significant ecological areas as a component of the MGS conservation strategy would not likely result in adverse impacts, as SEA TAC already considers impacts of new development relative to the MGS, and ensures, where appropriate, that 2081 take authorization is secured before the project is approved.	Specified Conservation Areas Outside the MGS CA Los Angeles County Significant Ecological Area Sierra Foothills Habitat Connector • The Sierra Habitat Connector would not be established, which could result in significant impacts if development severs this important corridor.
Specified Conservation Areas Outside the MGS CA Species-specific Conservation Areas MGS conservation would benefit from the establishment of the following new conservation areas for other species (acreage given in parenthesis are public lands occurring within the MGS range): Alkali Mariposa Lily (1.5 mi^2), Barstow Woolly Sunflower (27 mi^2), Bendire's Thrasher (20 mi^2), Lane Mountain Milkvetch (19 mi^2), and North Edwards (1.8 mi^2).	Specified Conservation Areas Outside the MGS CA Species-specific Conservation Areas
Management Structure within the MGS CA DWMA Management within the MGS CA • (AB-1) (AB-1) Two of the four DWMAs (i.e., Fremont-Kramer and Superior-Cronese) would be encompassed in the MGS HCA, including 946 mi^2 of public lands. Management within the DWMAs would benefit MGS conservation. Incidental Take Authorization • Failure to issue a programmatic habitat conservation plan and 2081 permit would result in perpetuating serious existing problems for authorizing take of the MGS, similar to those described for above for tortoise. Project proponents would be required to trap or assume presence and obtain individual take permits, which would provide for conservation at the discretion of the proponent (i.e., variable use of the DTPC or other entities for compensation). Compensation and Fee Structure • (AB-5) The MOG compensation formula has been applied to compensation ratios when tortoise is also involved, but is not applied under 2081 permitting when only the MGS is affected.	Management Structure within the MGS CA DWMA Management within the MGS CA Incidental Take Authorization Compensation and Fee Structure • (AB-5) Enhancement and endowment fees ($350/acre) would continue to be collected for MGS on a case by case basis, and existing permitting problems would be perpetuated, resulting in impacts to MGS conservation.

BENEFITS	RESIDUAL IMPACTS
Management Structure within the MGS CA 1 % Allowable Ground Disturbance • (AB-6) The one percent allowable ground disturbance threshold would apply to public lands (only), and minimize the amount of MGS habitat that could be developed. Best Management Practices • (AB-10) Implementation of BMPs within DWMAs and the MGS CA would minimize the amount of habitat disturbance associated with direct impacts.	Management Structure within the MGS CA 1 % Allowable Ground Disturbance Best Management Practices • (AB-10) Indirect impacts would likely occur in spite of implementing BMPs, as described above for the tortoise.
Management Structure within the MGS CA HMP Instead of ACEC Designation • (AB-2) Designation of the MGS CA as a BLM wildlife habitat management area would have some benefits over unclassified lands, although the advantages are not clear. • (AB-1) Although the larger MGS CA would not be designated as an ACEC, those public lands within the two DWMAs would be designated as such, and would provide for more protection than the HMA envisioned for the non-overlapping portions of the MGS CA.	Management Structure within the MGS CA HMP Instead of ACEC Designation • (AB-2) Failure to designate the MGS CA as an ACEC would result in far less protection and funding priorities, which is a serious weakness of this alternative.
Miscellaneous Conservation Programs Feral Dog Management Plan • (AB-8) Failure to establish a feral dog management plan is not likely to adversely affect the MGS, as feral dog predation has not been documented as a significant threat.	Miscellaneous Conservation Programs Feral Dog Management Plan
Miscellaneous Conservation Programs Habitat Credit Component • (AB-6) Application of the habitat credit component of MGS Alternative A to public lands would result in beneficial impacts described relative to the desert tortoise.	Miscellaneous Conservation Programs Habitat Credit Component
Miscellaneous Conservation Programs Law Enforcement • (AB-9) Increased law enforcement within the two DWMAs would be limited to public lands, and would benefit MGS conservation where enforcement activities minimize the amount of habitat degradation, particularly cross country travel.	Miscellaneous Conservation Programs Law Enforcement • (AB-9)There is no intent to increase ranger patrols on public lands within the HCA, which may constitute a marginal impact where illegal human uses result in degraded habitats.
Miscellaneous Conservation Programs Raven Management Plan • (AB-11) Although Dr. Leitner indicated anecdotal evidence that common ravens may prey on the MGS, there are no available data to assess the relative level of the impact. Beneficial or adverse impacts are unknown.	Miscellaneous Conservation Programs Raven Management Plan

BENEFITS	RESIDUAL IMPACTS
Transportation Road Maintenance	Transportation Road Maintenance • (AB-7) Highway maintenance seasonal restrictions, roadbed and berm requirements, and preclusion of the use of invasive weeds for landscaping would apply only to portions of roads on public lands, which could result in impacts to the MGS, which is known to burrow in roadside berms. There are no available data to determine if this may constitute a significant impact, but it is likely to constitute an impact where MGS burrows would be destroyed.

The advantages and disadvantages of Alternative B on public lands would generally be the same as given for Alternative A. The most important differences concern: (1) the failure to include private lands in the MGS CA, an exclusion of 567 mi^2 of private lands that could result in significant impacts; and (2) the lack of application of BMPs to private land projects. Another difference between Alternative B and other alternatives would be the failure of Alternative B to capture about 500 mi^2 of creosote bush scrub. The other alternatives encompass between 1,751 and 1,771 mi^2 of this community; Alternative B includes 1,271 mi^2, or about 480 mi^2 less than Alternative A, where this community occurs primarily on private lands.

4.3.2.4 Mojave River Bioregion

The eleven animal species dependent on the Mojave River riparian habitat would not benefit from the requirement to maintain groundwater levels in the river. Eradication of invasive plants would continue as a proactive program of the Mojave Desert Resource Conservation District, but would most likely be at a reduced level compared to the HCP mandate to work in areas where species are at risk, including Camp Cady and near Helendale. BLM would continue its restoration efforts at Afton Canyon.

Incidental take permits could not be issued for most or all of the eleven riparian-dependent species in the Mojave River bioregion. In the worst case, the majority of occupied habitat could be eliminated for the Mojave River vole over the long term, leading this species towards extinction. Recovery of the least Bell's vireo and southwestern willow flycatcher could be impaired and the local range of the other riparian birds and the southwestern pond turtle would shrink to the regions where permanent groundwater remains in the upper and lower Mojave Narrows.

These impacts are not attributable to BLM actions. BLM management of its lands along the Mojave River would not adversely affect Mojave River riparian species. Expansion of the Afton Canyon ACEC is the primary BLM action affecting the Mojave River bioregion riparian species, and this impact would be beneficial. Establishment of conservation areas for the Mojave fringe-toed lizard would positively contribute to conservation of the dry portions of the river.

4.3.2.5 Bats

The known roosts on BLM and NPS lands would be gated and protected. Exclusion of private lands in a conservation program would perpetuate the existing situation where many abandoned mine shafts, buildings, and old bridges may be overlooked for their potential as significant roosts. Protection of bats would rely on a case-by-case review under CEQA. Large mining projects on private land are expected to continue to be diligent in survey and mitigation efforts for bats, but smaller projects could easily impact roosts or important habitats without being detected.

Because BLM would pro-actively gate known bat roosts, continue to require surveys and provide for safe evacuation of bats at non-significant roosts, no adverse impacts to bats are expected from BLM actions in Alternative B. The case-by-case review of routes in riparian drainages and desert washes would be in place to protect foraging habitat for Townsend's big-eared bat and California leaf-nosed bat.

4.3.2.6 Other Mammals

Bighorn Sheep: Mining projects in the San Bernardino Mountains would continue to undergo review of impacts on bighorn, as at present. Public woks projects, including highways, railroads, or canals, could be built in areas blocking dispersal corridors. Dispersal corridors could also be subject to rural development without definition of or mitigation for potential impacts on bighorn.

Mojave River Vole: The Mojave River vole would not be covered by incidental take permits. Alternative B would provide no conservation program for this species because no public lands are present within the limited range. If groundwater levels declined to a point where riparian habitat dies and shrinks in extent, the impact on species would most likely involve a decline in the long-term. The Mojave River vole utilizes grass and meadow habitat along the river, which is more dependent on surface water than riparian trees. Therefore the vole would be expected to maintain its populations and persist for a long time after groundwater depletion had impacted other wetland-dependent species. The species would be expected to persist at the Mojave Narrows, but be extirpated from the remainder of the river if riparian conditions were eliminated and the stream was converted into a dry channel.

Yellow-eared Pocket Mouse: Impacts on the yellow-eared pocket mouse from Alternative B would be no different from Alternative A in the short term. Key parcels of private land in the Kelso Valley would not be acquired in the long-term, potentially making public lands management more difficult. The need for acquisition is unknown at present, so the significance of this long-term potential impact cannot be assessed.

4.3.2.7 Birds

The following bird species would experience impacts from Alternative B identical in nature to those described in Alternative A: Bendire's thrasher, Inyo California towhee, prairie falcon, and golden eagle.

Brown-crested Flycatcher: Permit take authority would not extend to brown-crested flycatcher under Alternative B. Alternative B would provide no conservation program for the primary nesting areas in the Mojave River. If groundwater levels declined to a point where riparian habitat dies and shrinks in extent, this species would endure a substantial decline in numbers in the West Mojave. Its local range would contract to the Mojave Narrows, where permanent groundwater is present. It would also persist at Big Morongo Canyon ACEC and the other riparian locations where groundwater levels are not an issue. This loss would not be adverse to the species as a whole, but would remove one of the larger breeding populations in the state.

Burrowing Owl: Without an education program delivered to applicants for discretionary permits, land development on private lands could substantially increase incidental take of nest sites for burrowing owls.

No permanent occupied habitat would be set aside for conservation of burrowing owl, except for that now present on public land (including State Parks, Ecological Reserves, BLM and NPS lands). Continuation of the existing CEQA review on private lands would result in continued eviction and relocation of owls from occupied nests. This take-avoidance measure generally results in unknown impacts on the specific owls, and does not assure protection of habitat for the evicted or relocated birds.

The beneficial impacts to burrowing owl from route designation would be the same as described in Alternative A.

Most burrowing owls are detected on private lands. Alternative B would therefore result in an adverse impact and a slow decline in the owl's numbers because conservation or protection of existing nest sites on public lands may not allow a sustainable population to remain. The Mojave Desert is a minor part of the burrowing owl's overall range, since it is originally a grassland species and is now adapted to major agricultural areas, including the Central Valley and Imperial Valley. The statewide impact would be relatively minor, based on current information on occupied range and habitats.

Ferruginous Hawk: Raptor-safe electrical distribution lines would be required on BLM lands only. This would miss potential problem poles in several key wintering areas, particularly the Antelope Valley and the Mojave Valley. The existing program of Southern California Edison Company to identify and retrofit problem poles as necessary would alleviate electrocution mortality to some extent, though imposition of a requirement for raptor-safe distribution lines for all jurisdictions would be preferable.

Gray Vireo: Impacts to the gray vireo would be similar to Alternative A except in Los Angeles County. Existing habitat on public lands designated as Wilderness, ACECs and within Joshua Tree National Park would continue to function for conservation and the designation of the Carbonate Endemic Plants Research Natural Area ACEC would be beneficial to this bird. Within Los Angeles County, impacts would depend on resolution of the proposed Significant Ecological Areas program of Los Angeles County. The Big Rock Creek and Mescal Creek areas of the San Gabriel Mountains foothills are the most important known occupied habitat within the West Mojave Plan boundaries. Without establishment of the Big Rock Creek Conservation Area on private lands, the worse case-scenario would lead to rural development and fragmentation and elimination of the disjunct occurrences. Protection as a Significant Ecological Area with minimum lot sizes of ten acres would most likely maintain the habitat, at least in the short term.

The gray vireo would not be adversely affected overall, but would lose a portion of the western edge of its range. From a statewide perspective this loss would constitute a substantial reduction, perhaps qualifying the species for listing under CESA.

Le Conte's Thrasher: Conserved habitat within the DWMAs would be fragmented by the ownership patterns, but threats to LeConte's thrasher are minimal. No adverse impact to the species is anticipated from Alternative B.

Long-eared Owl: Habitat has not been well defined for the long-eared owl, but most known sites are protected, as at Indian Joe Canyon in the Argus Mountains or at Big Morongo Preserve. The pro-active measure of conserving habitat at Big Rock Creek would not be implemented under Alternative B, which could lead to rural development and fragmentation of the habitat at that location in the long term. Impacts would depend on resolution of the proposed Significant Ecological Areas program of Los Angeles County.

Establishment of Key Raptor Area in the Argus Mountains would benefit the long-eared owl by the requirement to monitor and report on those sites every five years.

Southwestern Willow Flycatcher: Alternative B would provide no conservation program for the primary nesting areas in the Mojave River. If groundwater levels declined to a point where riparian habitat dies and shrinks in extent, this species would endure a substantial decline in numbers in the West Mojave. This loss would not be significant to the species as a whole, but would remove one of the few breeding populations in the state and a place where recovery is possible.

Migration habitat in the east Sierra canyons would remain protected under Alternative B.

Summer Tanager: Most occurrences of the summer tanager are not on BLM managed lands and it is unlikely that incidental take authorization could be provided to this species under Alternative B. Alternative B would provide no conservation program for the primary nesting areas in the Mojave River. If groundwater levels declined to a point where riparian habitat dies and shrinks in extent, this species would endure a substantial decline in numbers in the West Mojave. This loss would not be significant to the species as a whole, but would remove one of

the larger breeding populations in the state. The local range would contract to the Mojave Narrows, where permanent groundwater is present. It would also persist at Big Morongo Canyon ACEC and the other riparian locations where groundwater levels are not an issue.

Vermilion Flycatcher: Most occurrences of the vermilion flycatcher are not on BLM managed lands and it is unlikely that incidental take authorization could be provided to this species under Alternative B. Alternative B would provide no conservation program for the primary nesting areas in the Mojave River. If groundwater levels declined to a point where riparian habitat dies and shrinks in extent, this species would endure a substantial decline in numbers in the West Mojave. This loss would not be significant to the species as a whole, but would remove one of the larger breeding populations in the state. The species might be eliminated from the Mojave River. It would persist at Big Morongo Canyon ACEC and the other riparian locations where groundwater levels are not an issue.

Western Snowy Plover: Most, but not all, playas with nesting habitat would be conserved. High-potential nest areas including Bristol Lake would not be protected, even temporarily. Impacts to this species would be potentially adverse at a few specific locations on private land.

Western Yellow-billed Cuckoo: Incidental take authorization could not be provided for the yellow-billed cuckoo under Alternative B.

Alternative B would provide no conservation program for the potential habitat that may be important to recovery in the Mojave River. If groundwater levels declined to a point where riparian habitat dies and shrinks in extent, this species would lose habitat that could be important to recovery.

Migration habitat in the east Sierra canyons would remain protected under Alternative B.

Yellow-breasted Chat: Alternative B would provide no conservation program for the substantial nesting areas in the Mojave River and the habitat at Big Rock Creek, and it is unlikely that incidental take authorization could be granted for this species. If groundwater levels in the Mojave River declined to a point where riparian habitat dies and shrinks in extent, this species would endure a substantial decline in numbers in the West Mojave. The Big Rock Creek riparian site would not be protected as public land, but existing wetland protection laws are probably adequate to maintain the bird populations at that site. The potential loss of nesting habitat in the Mojave River would not be significant to the species as a whole. Many other nesting areas would remain within the state, and within the West Mojave, as at Big Morongo Canyon, Whitewater Canyon and the east Sierra canyons.

Yellow Warbler: Alternative B would provide no conservation program for the substantial nesting areas in the Mojave River and the habitat at Big Rock Creek, and it is unlikely that incidental take authorization could be granted for this species. If groundwater levels in the Mojave River declined to a point where riparian habitat dies and shrinks in extent, this species

would endure a substantial decline in numbers in the West Mojave. The Big Rock Creek riparian site would not be protected as public land, but existing wetland protection laws are probably adequate to maintain the bird populations at that site. The potential loss of nesting habitat in the Mojave River would not be significant to the species as a whole. Many other nesting areas would remain within the state, and within the West Mojave, as at Big Morongo Canyon, Whitewater Canyon and the east Sierra canyons.

Protection of migration and nesting habitat in the east Sierra canyons would be the same as Alternative A.

4.3.2.8 Reptiles

Mojave Fringe-toed Lizard: The goals for conservation of the fringe-toed lizard under an HCP could not be met by conservation under Alternative B. However, new BLM programs would adequately protect fringe-toed lizards at several sites, including the Mojave River, Alvord Mountain, Pisgah Crater and Sheephole Wilderness. Existing ACECs at Cronese Lakes and Manix serve to conserve those occurrences.

The westernmost population at Saddleback Buttes State Park is likely to be extirpated in the long term without a pro-active program to preserve the occupied habitat and ecosystem process that transport and sort the sand by water and wind. The population within the city limits of Twentynine Palms may become fragmented by future development.

The Mojave fringe-toed lizard is not seriously threatened throughout its range, and the BLM-only alternative would beneficially affect six occupied locations. Outside the West Mojave thirteen additional locations support this species, and threats at these sites are minimal. Some are protected within the Mojave National Preserve and Death Valley National Park.

Panamint Alligator Lizard: Impacts to the Panamint alligator lizard from a BLM-only plan would be the same as those described for Alternative A.

San Diego Horned Lizard: About half of the range of the San Diego horned lizard in the West Mojave could not be conserved under Alternative B. Loss of the populations in the San Gabriel and San Bernardino Mountains foothills on private lands would be expected from long-term fragmentation of the habitat by rural and some suburban development. This impact would not affect the viability of the species overall, since the major portion of its range is on the coastal slope of the Transverse Ranges.

Establishment of the Carbonate Endemic Plants Research Natural Area ACEC and designation of routes in the Juniper and Bighorn subregions would benefit the San Diego horned lizard, which is vulnerable to vehicle collisions.

Southwestern Pond Turtle: It is unlikely that incidental take permits could be issued for southwestern pond turtle, because the majority of occurrences are found on private land or are dependent on water supply to the Mojave River, which is not controlled by BLM. Alternative B would provide no conservation program for the two non-federal habitat areas in the Mojave River. If groundwater levels declined to a point where riparian habitat dies and shrinks in extent, this species would endure a substantial decline in numbers in the West Mojave. This loss would not be significant to the species as a whole, but would remove one of the larger breeding populations in the state.

4.3.2.9 Plants

The following plant species would experience impacts from Alternative B identical in nature to those described in Alternative A: Charlotte's phacelia, flax-like monardella, Kelso Creek monkeyflower, Mojave tarplant, Red Rock poppy, Red Rock tarplant, Reveal's buckwheat, triple-ribbed milkvetch and white margined beardtongue.

Alkali Mariposa Lily: Most occurrences of alkali mariposa lily are on private land and would not be conserved under Alternative B. The major population surrounding Rosamond Lake outside Edwards AFB is threatened with fragmentation by urban development, which would likely continue. Adverse impacts to the species would result from this alternative, and the species would rely on the existing protection afforded by military management.

The occurrence of alkali mariposa lily west of Paradise Springs on BLM lands would remain protected under existing management under Alternative B.

Barstow Woolly Sunflower: Alternative B can conserve most, but not all, of the known occurrences of Barstow woolly sunflower outside Edwards AFB. The extension of the major population on the base northwest of Kramer Junction would not be conserved by the North Edwards Conservation Area proposed in Alternative A, and would likely be ultimately fragmented by scattered commercial and industrial development. Known populations would benefit from establishment of a new Barstow woolly sunflower ACEC adjacent to the West Mojave CDFG Ecological Reserve and from imposition of site-specific measures for siting of utilities within the designated corridors. Route designation within the range will also benefit this West Mojave endemic plant.

Carbonate Endemic Plants: The four species of listed carbonate endemic plants are not threatened in the short term within the CDCA. Without a long-term protection plan, however, industrial mining is likely to impact these plants and contribute to further fragmentation of the habitat. Establishment of a Research Natural Area ACEC in conjunction with similar measures by the Forest Service would ensure their long-term survival. Impacts from Alternative B are similar to those of Alternative A except that important private land occurrences would not be addressed in detail. Assuming that the Carbonate Habitat Management Strategy is put into place, overall impacts to the carbonate endemic plants are reduced to acceptable levels and the goal of permanent protection would be achieved.

Crucifixion Thorn: Crucifixion thorn would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Coyote subregion. Because of the remote areas of occurrence of crucifixion thorn, no adverse impacts are expected to this species for the duration of the West Mojave Plan.

Desert Cymopterus: Desert cymopterus would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Kramer and Superior subregions. Without the establishment of a conservation area northwest of Kramer Junction, however, occurrences and habitat could be lost or fragmented. Lack of a rangewide plan for this narrow endemic plant could lead to its listing as threatened or endangered within the term of the Plan.

Kern Buckwheat: Impacts to this very restricted endemic plant would be similar to Alternative A, except that the private land occurrence would not be specifically protected by a requirement of avoidance. The CEQA review accompanying any development application on these lands would most likely be adequate to conserve the species. No adverse impacts are anticipated from Alternative B.

Lane Mountain Milk vetch: The BLM conservation program for Lane Mountain milkvetch would result in eventual acquisition of most private land containing this endangered plant, in conjunction with the Army mitigation plan for expansion of operations at Fort Irwin. Without participation of the local jurisdictions, some occurrences on private land could be lost prior to acquisition. This would be an impact making recovery less likely and potentially jeopardizing the continued existence of Lane Mountain milkvetch. This outcome is unlikely because threats to occupied habitat on private lands outside the military boundaries are few.

Little San Bernardino Mountains Gilia: Incidental take permits could not be issued for this species under Alternative B. Without a proactive approach to protection of the limited desert wash habitat, gilia populations would be expected to decline over the long term, perhaps to the point where the plant would become listed as threatened or endangered.

Mojave Monkeyflower: Under Alternative B, the majority of Mojave monkeyflower populations would be conserved. Some of the remaining occurrences on private land would be lost, though threats from development are few in the known occupied habitat. The threat of fragmentation of habitat, which isolates occurrences from each other, making pollination more difficult, would increase. The combined impacts of fragmentation and potential loss of occurrences for this West Mojave endemic would be a substantial adverse impact.

Parish's Alkali Grass: No conservation would be assured for Parish's alkali grass. Discretionary development at the single known site would depend on mitigation measures imposed by the local jurisdiction. Because this is a wetland dependent plant and known to be very rare, it is likely that avoidance would be required by the wetland protection laws and the CEQA process. The surrounding uplands could be developed.

Parish's Phacelia: Parish's phacelia would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Coyote subregion. No acquisition of private lands containing occupied habitat and a buffer area connecting the dry lakes would be undertaken. Potential impacts on Parish's phacelia would be determined on a case-by-case basis by San Bernardino County through the CEQA process. However, because of the remote areas of occurrence of Parish's phacelia and the lack of threats from land use changes, no adverse impacts are expected to this species for the duration of the West Mojave Plan.

Parish's Popcorn Flower: No conservation would be assured for Parish's popcorn flower. Discretionary development at the single known site would depend on mitigation measures imposed by the local jurisdiction. Because this is a wetland dependent plant and known to be very rare, it is likely that avoidance would be required by the wetland protection laws and the CEQA process. The surrounding uplands could be developed.

Salt Springs Checkerbloom: No conservation would be assured for the Salt Springs checkerbloom. Discretionary development at the single known site would depend on mitigation measures imposed by the local jurisdiction. Because this is a wetland dependent plant and known to be very rare, it is likely that avoidance would be required by the wetland protection laws and the CEQA process. The surrounding uplands could be developed.

Shockley's Rock-cress: Shockley's rock-cress is not threatened in the short term within the CDCA. Without a long-term protection plan, however, industrial mining is likely to impact this species and contribute to further fragmentation of the habitat. Establishment of a Research Natural Area ACEC in conjunction with similar measures by the Forest Service would ensure its long term survival. Impacts from Alternative B are similar to those of Alternative A except that important private land occurrences would not be addressed in detail. Assuming that the Carbonate Habitat Management Strategy is put into place, overall impacts to Shockley's rock-cress are reduced to acceptable levels and the goal of permanent protection would be achieved.

Short-joint Beavertail Cactus: Nearly all of the range of the short-joint beavertail cactus in the West Mojave could not be conserved under Alternative B. Loss of the populations in the San Gabriel and San Bernardino Mountains foothills on private lands would be expected from long-term fragmentation of the habitat by rural and some suburban development. This adverse impact would reduce the species' range to the higher elevations of the National Forests.

4.3.3 Socio-Economics

4.3.3.1 Livestock Grazing

Impacts would be as described for Alternative A.

4.3.3.2 Mineral Development

The forecast for mining and anticipated impacts on access and availability of mineral resources on public lands, including from proposed mineral withdrawals, under Alternative B would be the same as Alternative A. The impact on mineral resources identified on private lands depends on the location of the project in relation to sensitive species or conservation areas. Within conservation areas, the mining impacts on private land in the long term would be similar to Alterative A because federally acquired private lands and mineral resources within conservation areas would be withdrawn, limiting access and availability of these resources to development.

Impacts on mining on private land from projects in areas of sensitive species would be negative relative to Alternative A. Permitting costs would increase because separate incidental take permits would be required for each project, trapping for MGS would be required, CDFG's compensation requirement would remain in place, with an endowment fee of $295 per acre for MGS, and pre-approved and programmatic Level 1 and Level 2 BMPs would not be available. Impacts on projects on private lands in areas without sensitive species would be positive relative to Alternative A because compensation fees and other mitigation for species protection would not apply under the BLM-only alternative.

Private land would not be affected by expansion of the Rand Mountains-Fremont Valley ACEC because the designation affects public lands only. The few acres of private land in Section 22 (T.29 S, R.340 E), have moderate potential for the occurrences of mineral resources, which in this case, is vein or disseminated gold.

The portion of the Big Rock Creek sand and gravel deposit south of Highway 138 would not be part of a BLM conservation area because most, if not all of the land is under private ownership. Most constraints are placed on mining by the expanded SEA boundary proposed by Los Angeles County (PCR Services Corp., et al., 2000, p. 3). A single parcel of public land would, however, be retained, and management calls for a case-by-case review. The main conservation provision is that the stream flow must not be impeded by any aggregate mine

4.3.4 Cultural Resources

Since this alternative is essentially the same as Alternative A but applies only to BLM lands, and since the analysis for Alternative A covered primarily resources known to exist on BLM lands, the impacts of Alternative B would be substantially the same as those for Alternative A.

4.4 ALTERNATIVE C: TORTOISE RECOVERY PLAN

Impacts would be as described for Alternative A, except as discussed below.

4.4.1 Air Quality

Impacts would be as described for Alternative A, except as specifically noted below, in Table 4-50.

Table 4-50
Air Quality Impacts – Alternative C

ACTIVITY	POLLU-TANT	CHANGE DIRECTION	MAGNITUDE	TIME SCALE	LOCATION	NOTES
Vehicle restrictions (speed Limits)	PM_{10}	Decrease	Slight less than alternative "A"	Short & long term	Within DWMAs on BLM only	Reduced vehicle speeds would reduce particulate emissions
Vehicle competitive events	PM_{10}	Decrease	Slight less than alternative "A"	Short and long term	Within DWMAs	Elimination of competitive events would decrease particulate emissions.

4.4.2 Biological Resources

4.4.2.1 Natural Communities

Impacts to natural communities under Alternative C would be generally the same as described for Alternative A. Without a limitation on allowable new ground disturbance and the 5:1 mitigation ratio within the DWMAs, some land development could take place prior to acquisition of private inholdings, which would cause some habitat fragmentation. The cessation of grazing within the DWMAs would benefit the natural communities, particularly the blowsand areas east of Harper Lake. The acreage of each natural community that is protected by Alternative C is presented in Table 4-51.

Table 4-51
West Mojave Natural Communities Impacted by Alternative C (In Acres and %)

NATURAL COMMUNITY	TOTAL ACREAGE	EXISTING CONSERVATION		NEW CONSERVATION		TOTAL CONSERVATION		POTENTIAL LOSS	
Alkali seep	59	0		0		0		59	(100)
Alkali sink scrub	10,895	1,014	(9.3)	4,138	(38.0)	5,152	(47.3)	5,743	(52.7)
Big sagebrush scrub	9,601	8,108	(84.5)	1,081	(11.3)	9,190	(95.7)	411	(4.3)
Blackbush scrub	132,603	87,343	(65.9)	7,545	(5.7)	94,888	(71.6)	37,715	(28.4)
Chamise chaparral	28,593	0		0		0		28,593	(100)
Cottonwood-willow riparian forest	11,533	6,793	(58.9)	1,571	(13.6)	8,364	(72.5)	3,170	(27.5)
Creosote bush scrub	4,025,617	459,004	(11.4)	1,348,625	(33.5)	1,807,629	(44.9)	2,217,987	(55.1)
Desert holly scrub	21,716	2,190	(10.1)	17,452	(80.4)	19,641	(90.4)	2,075	(9.6)
Desert wash scrub	34,496	4,902	(14.2)	3,518	(10.2)	8,421	(24.4)	26,075	(75.6)
Fan palm oasis	33	0		0		0		33	(100)
Freshwater seep	388	0		0		0		388	(100)
Gray pine-oak woodland	2,678	49	(1.8)	0		49	(1.8)	2,629	(98.2)
Greasewood scrub	3,662	0		1,947	(53.2)	1,947	(53.2)	1,715	(46.8)
Hopsage scrub	6	5	(83.3)	1	(16.7)	6	(100)	0	
Interior live oak woodland	589	0		0		0		589	(100)
Jeffrey pine forest	1,811	1,811	(100)	0		1,811	(100)	0	
Joshua tree woodland	10,383	4,763	(45.9)	269	(2.6)	5,032	(48.5)	5,351	(51.5)
Juniper woodland	87,167	6,960	(8.0)	1,434	(1.6)	8,395	(9.6)	78,772	(90.4)
Mesquite bosque	7,110	2,491	(35.0)	1,349	(19.0)	3,839	(54.0)	3,271	(46.0)
Mojave mixed woody scrub	689,589	378,795	(54.9)	124,710	(18.1)	503,505	(73.0)	186,084	(27.0)
Mojave riparian forest	4,687	28	(0.6)	0		28	(0.6)	4,659	(99.4)
Montane meadow	966	0		0		0		966	(100)
Montane riparian scrub	2,228	203	(9.1)	238	(10.7)	441	(19.8)	1,787	(80.2)
Native grassland	3,375	0		68	(2.0)	68	(2.0)	3,306	(98.0)
Northern mixed chaparral	992	992	(100)	0		992	(100)	0	
Pinyon pine woodland	18,773	12,077	(64.3)	1,171	(6.2)	13,248	(70.6)	5,525	(29.4)
Pinyon-juniper woodland	158,329	84,581	(53.4)	12,022	(7.6)	96,603	(61.0)	61,727	39.0)
Rabbitbrush scrub	7,842	92	(1.2)	0		92	(1.2)	7,750	(98.8)
Scrub oak chaparral	36,385	23,106	(63.5)	0		23,106	(63.5)	13,279	(36.5)
Saltbush scrub	591,713	18,897	(3.2)	222,091	(37.5)	240,998	(40.7)	350,926	(59.3)
Semi-desert chaparral	128,230	3,855	(3.0)	5,156	(4.0)	9,010	(7.0)	119,220	(93.0)
Shadscale scrub	38,602	7,194	(18.6)	31,408	(81.4)	38,602	(100)	0	
TOTAL	6,070,651	1,115,253	(18.4)	1,785,793	(29.4)	2,901,046	(47.8)	3,169,605	(52.2)

The table excludes acreage in the GIS database describing landforms (lava, lakes, playas), disturbed lands (agriculture, urban) and disturbed plant communities (non-native grassland, ruderal).

Total in area excludes military lands.

Existing conservation includes ACECs, Wilderness, National Parks, State Parks, CDFG Ecological Reserves.

New conservation includes the HCA for this alternative. Los Angeles County SEAs are excluded.

Potential loss includes areas not under specific conservation and available for development or other use. Actual loss of these communities is dependent on location, development trends and land ownership.

4.4.2.2 Desert Tortoise

Excepting minor differences, Alternative C shares the same impacts associated with Alternative A for the following categories, which for the most part, are not reiterated in Table 4-52: BLM Management of Category I, II, & III Habitat, Plan Implementation, State Permitting, Maintaining Multiple Use Classes, 1% Allowable Ground Disturbance, BLM Management, BLM Land Tenure Adjustment (LTA), Motorized Vehicle Access, Agriculture, Commercial Filming, Construction Activities, Disease Management, Drought, Education Program, Energy & Mineral Development, Feral Dog Management, Fire Management, Sheep Grazing, Habitat Credit Component, Motorized Vehicle Access, Raven Management, Utilities, and Weed Control.

Table 4-52 presents a summary of the benefits and residual impacts of Alternative C.

Table 4-52
Tortoise Impacts of Alternative C

BENEFITS	RESIDUAL IMPACTS
DWMA DESIGNATION AND CONFIGURATION	
Recent and Current Tortoise Occurrence **Includes:** • 2,307 mi^2 (21% of the 2002 range) • Good representation in central part of 2002 range • 427 of 563 mi^2 (76%) of higher density areas • 289 of 424 (68%) observed tortoises • All currently designated USFWS critical habitat • 856 mi^2 of BLM Category I (96%) and 317 mi^2 of Category II (87%) habitats	Recent and Current Tortoise Occurrence **Does not include:** • 8,827 mi^2 (79%) of the 2002 range • Poor representation in periphery of range • 136 mi^2 (24%) of higher density areas • 135 of 424 (32%) observed tortoises • 38 mi^2 of BLM Category I (4%) and 47 mi^2 of Category II (13%) habitats
Land Management Within DWMAs • Would result in three or four new reserve managers, additional staff, and law enforcement personnel, which would provide for enhanced implementation of DWMA-specific management actions • Formation of local advisory committees would provide for oversight, which would facilitate conservation management	Land Management Within DWMAs • Proposal would require more funding than identified in Alternative A
DESIGNATION AND MANAGEMENT OF DWMAS AS ACECS	
Size Relative to the Existing Tortoise ACEC • Net increase of 1,555 mi^2 of public lands within ACECs, which is 39 times larger than the existing one (DTNA at 40 mi^2)	Critical Habitat versus New DWMAs • As in Alternative A, would fail to clarify future management of critical habitat lands outside DWMAs and non-critical habitat inside them
BLM ACEC Management • Designating the Ord-Rodman DWMA as an ecological reserve and a research natural area, would further clarify conservation management by the BLM; ecological reserve status would result in more restrictive management than provided for under ACEC management	BLM ACEC Management

BENEFITS	RESIDUAL IMPACTS
Federal Permitting • Same as Alternative A, with following differences: • No Survey Areas would not be designated, which would require surveys in areas where they would provide minimal benefits to tortoises • Would provide for a drop-off site for unwanted captive tortoises at BLM's Barstow offices, and develop programs to promote use of unwanted tortoises for research and educational purposes, which would be intended to minimize release of pets, including diseased animals • Would function to salvage breeding stock from BLM open areas to supplement populations in DWMAs, which would ostensibly minimize (i.e., salvage) and mitigate (i.e., supplement) impacts	Federal Permitting • Same as Alternative A, with following differences: • Failure to establish No Survey Areas would result in relatively fewer benefits and more costs to project proponents • Drop-off sites and other programs directed at owners of pet tortoises would not substantially curtail releases by informed (i.e., who know they should not release tortoises) and uninformed (i.e., who are unaware they should not release animals) owners • Experimental program that would assess, but not necessarily result in, efficacy of translocation; would increase the risk of introducing diseased animals from BLM open areas into DWMA conservation areas
Compensation & Fee Structure • All compensation, fee and implementation structures proposed by Alternative A apply to this alternative, except as expressly noted in the discussion of species conservation measures (section 2.4.4, below)	Compensation & Fee Structure
PRIVATE LAND ACQUISITION AND PUBLIC LAND DISPOSAL	
Acquisition Priorities • Would have the goal of acquiring all private lands in DWMAs, which would substantially facilitate conservation programs and BLM management • Although cost prohibitive as given to the right, would allow for strengthened adaptive management to re-establish tortoises in die-off areas and facilitate many other conservation programs	Acquisition Priorities • Prioritizes limited funding to acquire lands, which could substantially reduce funding conservation programs • Assuming a purchase price of $500/acre, acquisition of all DWMA private lands (i.e., estimated at 664 mi^2) would cost $212,480,000 • Failure to acquire all private lands would result in withdrawal of take authorization, unless the amount of acquired land per year were specified; success of obtaining ALL private lands is highly unlikely, and may not contribute substantially to tortoise conservation
Education • Same as Alternative A, with following specified actions: • Each DWMA would have an associated visitor center or set of interpretive sites and panels; • A visitor education center would be constructed at the DTNA; • Programs would be developed to promote use of unwanted captives for research and educational purposes, all of which would enhance the program	Education • Although the programs given to the left would be useful, they would fail to reach the broader public, as would occur under the education program envisioned in Alternative A

BENEFITS	RESIDUAL IMPACTS
CATTLE GRAZING ON BLM ALLOTMENTS	
• Measures identified in Alternative A would apply to the Ord Mtn Allotment, which would also be designated as a grazing experimental management zone; an Avery-like study would be completed within five years of plan adoption to determine the competitive threshold between cattle and tortoises; in the interim, the 230 pound threshold would be used • No cattle grazing would be authorized in the Harper Lake, Cronese Lakes, or Pilot Knob allotments, which would avoid adverse impacts identified in Alternative A	• Alternative fails to provide for relinquishment of allotments outside DWMAs where tortoises would continue to be affected
GUZZLERS	
	• Alternative fails to identify how existing impacts of guzzlers would be assessed and remedied, which is a marginal impact
HEAD STARTING PROGRAM	
• Same as Alternative A, except the program would be established at the DTNA rather than near Fremont Peak, which has the advantages of introducing hatchlings into a fenced area, and allowing salvage of females from adjacent high human-use areas near California City	• Would fail to reintroduce tortoises in older die-off areas in the northern portions of the Fremont-Kramer DWMA, where numbers of tortoises have been substantially reduced • Would not provide for increased raven management, which would be necessary where subadult tortoise would be introduced
LAW ENFORCEMENT	
• Same as Alternative A, with additional actions: • Installing a double row of barrier fencing between the Fremont-Kramer and Superior-Cronese DWMAs could minimize the spread of disease, but possibly not (see right). Use of these fences, as described in Alternative F, may be efficacious in preventing spread of disease, pending input from pertinent experts • Would result in fence installation adjacent to Barstow, north of Barstow, Kramer Junction, California City, Cantil, Galileo Hill, Randsburg, Johannesburg, Atolia, Helendale, and periphery of Superior-Cronese DWMA, which would ostensibly result in fewer impacts from adjacent areas from west to east • Would result in signing Ord-Rodman DWMA boundaries in the vicinity of Barstow, Newberry Springs, Lucerne, Landers and Lucerne Valley	• Same as Alternative A, with following additions: • Installing a double row of barrier fencing between the Fremont-Kramer and Superior-Cronese DWMAs to minimize the spread of disease may not be effective, since it appears that the disease is already located east and west of where this fence would be installed • Significant cost increase over Alternative A due to fence installation and maintenance costs, the latter of which would be required in perpetuity • Would fail to result in signing of other three DWMA boundaries, as ALL DWMA boundaries would be signed in appropriate places under Alternative A

BENEFITS	RESIDUAL IMPACTS
RECREATION ACTIVITIES	
• Same as Alternative A, except no competitive or organized vehicle events would be allowed in DWMAs, which would eliminate impacts associated with competitive corridors in the Ord-Rodman DWMA and dual sports throughout	• All available information indicates that there are very few impacts to tortoises and habitat associated with dual sports and regulated use (i.e., under yellow-flag conditions) of competitive event corridors, while the proposal to eliminate these uses would result in significant effects upon OHV recreation (see discussion below) and undermine public support of the conservation strategy, which is required to be successful
Gunshot Impacts • Shooting in DWMAs would be restricted to between September and February, which would substantially diminish the incidence of gun shot mortality of tortoises12 • Problems identified relative to availability of BLM law enforcement would persist, and could result in insufficient enforcement of this measure • If law enforcement issues could be resolved and result in increased and focused enforcement in DWMAs, the seasonal restriction would constitute a significant beneficial impact to avoid gunshot mortality, compared to Alternative A	Gunshot Impacts • Proposal would not likely be acceptable to the hunting and target shooting community, which would undermine the effectiveness of the strategy by failing to garner broad public support
TRANSPORTATION	
• Same as Alternative A, except that fencing program would be expanded to include about 380 linear miles[13] of additional fencing along Randsburg-Mojave Road (32 miles), Red Rock - Randsburg Road (18), Red Rock - Garlock Road (40), railroad north and adjacent to Highway 58 (142), Highway 247 (32), Interstate 15 (already fenced, so 0 miles), Fort Irwin Road (48), Manix Trail (34), and Copper City Road (34)	• There are no data to show that these roads (i.e., particularly dirt roads) warrant expenditure of funds that may best be used for other programs, which could substantially affect the overall conservation strategy that would already rely on limited funding
• Recovery Plan also recommends fencing 104 linear miles corresponding to the northern boundary of the Superior-Cronese DWMA, which would be very useful where it coincides with the Fort Irwin expansion area, but not in other places to the west (see right)	• Those portions of the northern boundary of the Superior-Cronese that are contiguous with China Lake NAWS would not need to be fenced; there is already an existing fence along much of this stretch, and there is little ground traffic at China Lake that would affect the conservation area to the south

[12] This conclusion is based on the assumption that tortoises are more likely to be encountered and shot between February and September, and that the new regulation would allow enforcement rangers to issue citations to anyone discharging firearms during the restriction period. This would not affect hunting activities between September and February, when bird hunting and other seasons are open.

[13] The linear miles given above were calculated by taking the length of each road cited in the recovery plan, where contiguous to DWMAs, and multiplying those lengths by two, since both sides of the roads would be fenced. This also assumes that both sides of the railroad north of Highway 58 would be fenced.

Overall, the Recovery Plan alternative would result in a conservation program that would be inferior to the one given in Alternative A. The only two programs that are considered to provide for more conservation than Alternative A include (a) elimination of cattle grazing from the Fremont-Kramer and Superior-Cronese DWMAs and (b) prohibition of competitive and organized sports in DWMAs.

The following programs significantly detract from Alternative C for the reasons given in the above table and described below. The Recovery Plan indicates that a minimum of three DWMAs would be acceptable, whereas four would be required under Alternative A. This alternative would require funding that is significantly higher than most alternatives, not all of which is justified. Acquiring all private lands in DWMAs could cost as much as $219,000,000; employing separate managers and staff for each DWMA (as opposed to one Implementation Team overseeing the program) would not necessarily result in better management but would cost more; significantly more money would be needed to fence dirt roads where no data support the expenditure. Limited funding could be applied to these programs at the expense of implementing others.

In general, the Recovery Plan focuses on proactive conservation programs that would be implemented in DWMAs and fails to address a multitude of impacts outside DWMAs. For example, Alternative C would be less effective in minimizing impacts to DWMAs and direct impacts in the ITA (e.g., no SRAs established). The Recovery Plan was general in nature and did not expressly provide for numerous programs identified in Alternative A that were inserted into Alternative C to "fill holes." Had these programs not been carried over from Alternative A, Alternative C would be far more deficient. As it is, the deficiencies identified above would persist in spite of the augmentation of Recovery Plan provisions that has occurred in this analysis.

4.4.2.3 Mohave Ground Squirrel

Alternative C would implement protective measures identified in the Recovery Plan and reiterated in Alternative C for the tortoise. These measures would apply to MGS conservation in the MGS CA and the two DWMAs on both public and private lands.

Similar impacts given for the tortoise and/or MGS (mostly in Alternative A for the two species) would affect the following programs where the two species ranges coincide: Incidental Take Authorization; Compensation and Fee Structure; 1 % Allowable Ground Disturbance; Best Management Practices; HMP Instead of ACEC Designation; Category I, II, & III and Critical Habitats for Tortoises; Conservation Relative to Military Bases; Commercial Filming and Plant Harvest; Fire Management; Habitat Credit Component; Raven Management Plan; Utilities Construction and Maintenance; Livestock Grazing; Surveys (Presence-Absence Surveys, Exploratory Surveys, Surveys for Other Species;) Road Maintenance; and Monitoring.

Table 4-53 reports only those benefits and residual impacts as they relate to MGS conservation that are different from the impacts identified under Alternative A for the tortoise. As such, the programs listed above are not reiterated in the table.

Table 4-53
Mohave Ground Squirrel Impacts

BENEFITS	RESIDUAL IMPACTS
Conservation Area Size of Conservation and Incidental Take Areas • Same as MGS Alternative A.	Conservation Area Size of Conservation and Incidental Take Areas
Specified Conservation Areas Outside MGS CA Los Angeles County Significant Ecological Area • Same as given above for Alternative B. Sierra Foothills Habitat Connector	Specified Conservation Areas Outside MGS CA Los Angeles County Significant Ecological Area Sierra Foothills Habitat Connector • Failure to establish this connector within the MGS CA may lead to compromising a critically important habitat corridor unless there is heightened county review.
Specified Conservation Areas Outside the MGS CA Species-specific Conservation Areas • See analogous section in MGS Alternative A, above	Specified Conservation Areas Outside the MGS CA Species-specific Conservation Areas
Management Structure within the MGS CA DWMA Management within the MGS CA • Conservation areas that would benefit the MGS include the two DWMAs, the MGS CA, and the new species-specific conservation areas listed above in MGS Alternative A.	Management Structure within the MGS CA DWMA Management within the MGS CA
Management Structure within the MGS CA Multiple Use Class Designations • BLM multiple use class changes would be as described for Alternative A and have the same beneficial impacts. Impacts are not likely to be as significant as for the tortoise, for example, since1,524 mi^2 within the MGS CA (57%) are already designated as class L.	Management Structure within the MGS CA Multiple Use Class Designations • Same as MGS Alternative A.
Miscellaneous Conservation Programs Dump Removal and Waste Management • (AC-9) The intent to cleanup surface toxic chemicals, unexploded ordinance, and illegal dumps in the two DWMAs would likely benefit MGS conservation, but to what extent is unknown, as these measures would be implemented relative to managing tortoise predators. • (AC-9) Eliminating predator use of authorized landfills and sewage ponds and prohibiting new landfills or sewage ponds in or near DWMAs has questionable conservation value for the MGS, as these predators (both ravens and canines) have not been identified as predators of the MGS.	Miscellaneous Conservation Programs Dump Removal and Waste Management

BENEFITS	RESIDUAL IMPACTS
Miscellaneous Conservation Programs Education • (AC-23) The establishment of visitor centers and interpretive sites and panels would be even more important for the MGS than it would be for the tortoise. The tortoise is a relatively high profile animal; few people are aware of the MGS, so the education for the MGS would necessarily need to be even more prevalent if MGS conservation is to succeed.	Miscellaneous Conservation Programs Education • Same as MGS Alternative A.
Miscellaneous Conservation Programs Feral Dog Management Plan • (AC-8) There is no indication that implementing emergency measures to control unleashed dogs and dog packs in the two DWMAs would benefit MGS conservation.	Miscellaneous Conservation Programs Feral Dog Management Plan
Miscellaneous Conservation Programs Habitat Reclamation and Restoration • (AC-1) Restoring surface disturbance within the two DWMAs and MGS CA, closing access to non-designated vehicle routes, and restoring non-designated roadbeds to their pre-disturbance state would all benefit MGS conservation by regaining habitats and minimizing more habitat degradation.	Miscellaneous Conservation Programs Habitat Reclamation and Restoration
Miscellaneous Conservation Programs Land Acquisition • (AC-19) The goal of the plan to acquire all private lands within the two DWMAs would constitute a significant beneficial impact, as maintaining large blocks of unfragmented habitat would be essential (Gustafson 1993).	Miscellaneous Conservation Programs Land Acquisition
Miscellaneous Conservation Programs Law Enforcement • (AC-23) The intent to require a reserve manager, additional staff, and law enforcement personnel for the two DWMAs would not be as beneficial to MGS conservation as it would be for the tortoise, given the different threats that affect the two species.	Miscellaneous Conservation Programs Law Enforcement • Costs of these programs may be cost prohibitive with little return, as given to the left.
Miscellaneous Conservation Programs Mining • (AC-6) The allowance for mining on a case by case basis in the two DWMAs would be mitigated during operation and require restoration to pre-disturbance conditions, both of which would benefit MGS conservation. • (AC-6) Requirements to restore surface disturbance within the two DWMAs to pre-disturbance conditions at open pit mines and hard rock quarries would benefit MGS conservation. • (AC-6) The intent to pursue mineral withdrawals identified by MGS Alternative A in the Rand Mountains would benefit MGS conservation if withdrawals, as required by the ACEC management plan, are actually implemented.	Miscellaneous Conservation Programs Mining

BENEFITS	RESIDUAL IMPACTS
Miscellaneous Conservation Programs Signing and Fencing DWMAs • (AC-15) The intent to sign or fence the two DWMA boundaries adjacent to communities and settlements would have the beneficial impact of informing the public that they are entering a conservation area for both tortoises and the MGS.	Miscellaneous Conservation Programs Signing and Fencing DWMAs • Expensive program may do little to protect habitats, although, as given to the left, the educational benefits would help.
Motorized Vehicle Access • (AC-25) Restoring designated closed routes to their pre-disturbance condition, limiting travel to safe speeds on designated signed routes, and implementing closures in the two DWMAs would have the beneficial impact of minimizing occasional road-kills and habitat degradation. • (AC-26) Prohibiting the establishment of new roads in the two DWMAs would be particularly important to MGS conservation, in the interest of avoiding new habitat fragmentation.	Motorized Vehicle Access
Recreation Competitive Events • (AC-2) Prohibiting all competitive events from the two DWMAs would constitute a beneficial impact by minimizing the amount of habitat degradation typically associated with these activities.	Recreation Competitive Events
Recreation Non-competitive Events (Dual Sports) • (AC-2) Prohibiting organized events (including dual sport) from the two DWMAs would constitute a marginal or neutral benefit, as dual sports are not likely to result in either habitat degradation or crushing individual MGS.	Recreation Non-competitive Events (Dual Sports)
Recreation Hunting and Shooting • (AC-5) The prohibition against firearm discharge in the two DWMAs between September and February would not contribute significantly to MGS conservation, as there is no evidence that this activity poses a threat to the MGS.	Recreation Hunting and Shooting
Recreation Stopping, Parking, and Camping • (AC-3) Restricting parking and camping to designated areas within DWMAs would provide for relatively less habitat degradation. • (AC-4) Minimum impact recreation (e.g. hiking, equestrian uses, birdwatching, and photography) that would be allowed for in the two DWMAs would not significantly impair MGS conservation.	Recreation Stopping, Parking, and Camping • (AC-3) Restricting parking and camping to within 300 feet from the centerline of open routes outside the two DWMAs would be a somewhat more negative impact, as this would include the portion of the MGS CA that does not overlap with the DWMAs.
Transportation Highway Fencing and Culverts • (AC-14) The intent to fence roadways and install culverts for tortoise conservation likely would have minimal benefits to the MGS, as they would neither serve to restrict MGS movement nor minimize habitat fragmentation.	Transportation Highway Fencing and Culverts

The same discussion following the MGS table in Alternative A applies to Alternative C, except for those portions of the MGS CA that overlap the tortoise DWMAs. MGS would receive a modest degree of additional protection in these areas, compared to Alternative A, due to the prohibition of competitive motorized vehicle activities, somewhat more restrictive stopping, parking and camping prescriptions, the requirement that new ground disturbance be restored, and the acquisition of all private lands within the DWMAs (to the extent that diversion of available funds for this purpose did not preclude implementation of other protective actions).

4.4.2.4 Bats

Impacts to bats would be as described for Alternative A.

4.4.2.5 Other Mammals

Impacts to other mammals (bighorn sheep, Mojave River vole, and yellow-eared pocket mouse) would be as described for Alternative A.

4.4.2.6 Birds

All covered bird species found outside the DWMAs would experience the same impacts as Alternative A.

Within the DWMAs, most birds would be well protected, with no substantial change from Alternative A. Cessation of grazing may provide a small additional benefit to burrowing owl and LeConte's thrasher, since these species nest on or near the ground where livestock impacts from trampling take place. The habitat within the DWMAs would not be subject to the 1% limitation on new allowable ground disturbance, nor would the 5:1 mitigation ratio apply, which could lead to habitat fragmentation prior to acquisition of private land. No conservation area would be established for Bendire's thrasher on Coolgardie Mesa. However, route designation for the Superior subregion and acquisition of private land under this Alternative would provide equal or better conservation for Bendire's thrasher because of uniform management by a public agency.

4.4.2.7 Reptiles

Mojave fringe-toed lizards would benefit from cessation of grazing in the Harper Lake and Cronese Lake allotments. Populations on the Alvord slope would benefit from acquisition of private lands. The blowsand habitat within the DWMAs would not be subject to the 1% limitation on new allowable ground disturbance, nor would the 5:1 mitigation ratio apply.

Impacts to other populations of the Mojave fringe-toed lizard would be as described for Alternative A.

Impacts on the Panamint alligator lizard, the San Diego horned lizard and the southwestern pond turtle would be as described for Alternative A.

4.4.2.8 Plants

For the following plants, impacts would be the same as described for Alternative A: alkali mariposa lily, carbonate endemic plants, Charlotte's phacelia, flax-like monardella, Kelso Creek monkeyflower, Kern buckwheat, Little San Bernardino Mountains gilia, Mojave tarplant, Parish's alkali grass, Parish's popcorn flower, Red Rock poppy, Red Rock tarplant, Reveal's buckwheat, Salt Springs checkerbloom, Shockley's rock cress, short-joint beavertail cactus, triple-ribbed milkvetch, and white-margined beardtongue.

Barstow Woolly Sunflower: Barstow woolly sunflower would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Fremont-Kramer and Superior-Cronese DWMAs. Cessation of grazing would probably be a beneficial impact. However, no 1% limitation on allowable ground disturbance would apply, nor would the 5:1 mitigation ratio be in effect. Acquisition of private lands within the DWMAs would benefit Barstow woolly sunflower by consolidating management for the species.

Outside the DWMAs, the provisions of the HCP would apply, enabling conservation of Barstow woolly sunflower within the North Edwards Conservation Area. Protection of this area would augment conservation in the DWMA and secure nearly all of the known occurrences. No adverse impacts are expected to this species under Alternative C.

Crucifixion Thorn: Crucifixion thorn would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Superior-Cronese DWMA. However, no 1% limitation on allowable ground disturbance would apply, nor would the 5:1 mitigation ratio be in effect. The public land measures and the lack of threats to crucifixion thorn on private land means no adverse impacts are expected to this species for the duration of the West Mojave Plan under Alternative C.

Desert Cymopterus: Desert cymopterus would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Fremont-Kramer and Superior-Cronese DWMAs. The cessation of cattle grazing in the Harper Lake allotment would be a significant benefit to the species. However, no 1% limitation on allowable ground disturbance would apply, nor would the 5:1 mitigation ratio be in effect. The conservation measures on public lands combined with the lack of threats on private lands would provide sufficient conservation within the DWMAs for desert cymopterus.

Outside the DWMAs, the provisions of the HCP would apply, enabling conservation of desert cymopterus within the North Edwards Conservation Area. Protection of this area would augment conservation in the DWMA and secure nearly all of the known cymopterus locations. No adverse impacts are expected to this species under Alternative C for the duration of the West Mojave Plan.

Lane Mountain Milk vetch: The Recovery Plan Alternative would attempt greater private land acquisition than Alternative A on Coolgardie Mesa, providing a buffer to the occupied habitat of Lane Mountain milkvetch.

No significant or adverse impacts to Lane Mountain milkvetch would result in the short term from implementation of Alternative C.

Mojave Monkeyflower: A portion of the Mojave monkeyflower habitat would lie within the Ord-Rodman Research Natural Area. Additional acquisition of private lands in this area would benefit the Mojave monkeyflower. However, no 1% limitation on allowable ground disturbance would apply, nor would the 5:1 mitigation ratio be in effect. Effects of an experimental grazing program for the Ord allotment cannot be determined. Given the conservation measures required by utilities using the corridor and the lack of threats from changing land uses on private land near Daggett Ridge the eastern population of Mojave monkeyflowers should be sufficiently protected from loss of habitat. Combined with the BLM actions in the Brisbane Valley to protect a core reserve, no adverse or significant impacts to Mojave monkeyflower are expected over the life of the West Mojave Plan under Alternative C.

Parish's Phacelia: Parish's phacelia would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Superior-Cronese DWMA. However, no 1% limitation on allowable ground disturbance would apply, nor would the 5:1 mitigation ratio be in effect. Private land acquisition within the Superior-Cronese DWMA would benefit the species. The conservation measures on public lands combined with the lack of threats on private lands mean that no adverse impacts are expected to this species under Alternative C for the duration of the West Mojave Plan.

4.4.3 Socio-Economics

4.4.3.1 Livestock Grazing

Impacts on livestock grazing would be as described for Alternative A, with the exception of cattle grazing in DWMAs.

Within DWMAs, cattle grazing would be prohibited from the proposed DWMAs described in the Desert Tortoise Recovery Plan. This would affect portions of the Ord Mountain, Cronese Lake, Harper Lake, and the Pilot Knob Allotments, which together offer 4,232 animal unit months of forage. The impacts on the grazing operations on these four allotments would vary considerably depending on current operations:

- The Pilot Knob Allotment is leased to a conservation organization that has never applied for grazing use, even when forage conditions were favorable. Impacts of this alternative would be minimal.

- The Ord Mountain Allotment is almost entirely within the proposed Ord-Rodman DWMA. It has the largest permitted use (3,632 AUMs) and most extensive grazing operation of the four allotments. Even though it would be designated as a cattle grazing experimental management zone, the impacts on the grazing operation could be much more extensive than on the Pilot Knob Allotment, depending on the nature of the "experimental management" program that was developed and implemented. The portion of the allotment that lies outside the DWMA may not be viable standing alone, because it has no developed water.
- Harper Lake Allotment impacts would be significant. Approximately two-thirds of the allotment would be excluded from cattle grazing. The southern third of this allotment is outside the DWMA, but has a marginal forage base and would not be viable by itself.
- The Cronese Lake Allotment would loose approximately half of its current acreage, however due to the lack of water in that portion of the allotment within the proposed DWMA (western half) the impact to this cattle operation would be minimal.

4.4.3.2 Mineral Development

The requirement to restore surface disturbance to pre-disturbance conditions would virtually shut down hard-rock mining within the 2,147 square miles of tortoise DWMAs, which have nearly 300,000 acres of moderate to high mineral potential. This impact would occur when existing SMARA Plans expire and new plans are applied for. Most SMARA Plans expire in 20 years so the impact on mining would come into play prior to the expiration of the West Mojave Plan. New operations would be required to import material from a source outside of the tortoise management area and place it in the pits and quarries to fill the void left from the mined-out material, something that is not generally feasible from an economic standpoint. In most cases, the expense from purchasing replacement material and securing permits to mine that material would be greater than that for mining the original product.

Further, it would probably require either artificial watering, or decades or centuries for natural vegetation to be restored to original diversity and density in the desert environment. Although sand and gravel pits could probably be restored, it would require a much longer span of time before restoration would be complete and the operator released from the period of liability.

About eight active mines are known to be operating within the proposed DWMAs. Impacts on the consumer would be added costs to import minerals such as landscaping rock from outside of DWMAs, or doing without certain types of rock, popular with consumers in the southwestern United States.

Mohave ground squirrel habitat would not be subject to the one percent AGD. However, this area would be subject to expensive and time-consuming delays to satisfy increased studies and mitigation associated with operation reviews as compared with Alternative A.

Otherwise, impacts would be similar to Alternative A.

4.4.4 Cultural Resources

Since this alternative includes the same DWMAs and the same motorized vehicle access provisions the impacts would be substantially the same as in Alternative A.

4.4.5 Cumulative Impacts

Livestock Grazing: Cumulative impacts would be similar to Alternative A. Cattle grazing would not be permitted in critical habitat on the Harper Lake (11,275 acres) and Cronese Lake (30,000 acres) allotments, and would be limited to an "experimental management" program on the Ord Mountain allotment (102,141 acres). There would also be the remaining portions of these allotments that may not be viable enough to have any grazing continue. This would increase the cumulative effects for this alternative by approximately 143,416 acres.

Minerals: Negative cumulative impacts from this alternative would be greater than those of Alternatives A and B because of the restoration requirement, and associated high costs which would render many surface disturbing mining projects uneconomic. This would remove otherwise valuable minerals from the market, costing jobs, tax base, and mine related purchases form the local communities.

Biological Resources: The Recovery Plan Alternative is well designed to prevent cumulative impacts to biological resources within the DWMAS, with the exception of potential impacts from small-scale mining. The lack of a limitation on new allowable ground disturbance and the disincentive 5:1 mitigation ratio could allow private land development in some parts of the DWMAs prior to acquisition, however.

Outside the DWMAs, cumulative impacts to biological resources would be as described for Alternative A.

4.5 ALTERNATIVE D: ENHANCED ECOSYSTEM PROTECTION

Impacts would be as described for Alternative A, except as described below.

4.5.1 Air Quality

Impacts would be as described for Alternative A above, except as specifically noted below, in Table 4-54.

Table 4-54
Air Quality Impacts – Alternative D

ACTIVITY	POLLU-TANT	CHANGE DIRECTION	MAGNITUDE	TIME SCALE	LOCATION(S)	NOTES
Vehicle routes	PM_{10}	Decrease	Slight	Short & long term	Johnson to Stoddard Valley area	Due to elimination of vehicle corridor
Vehicle restrictions	PM_{10}	Decrease	Slight	Short & long term	Within biologically sensitive areas	Due to requirement for street legal vehicles.

4.5.2 Biological Resources

4.5.2.1 Natural Communities

Alternative D approaches conservation of the covered species by protection of ecosystems, rather than an emphasis on preservation and management of known species locations. It therefore represents a more beneficial impact to natural communities than the species-based approach. The restriction of certain MAZ areas within DWMAs to street-legal vehicles would probably beneficially impact the most common creosote bush scrub and saltbush communities in those areas by preventing degradation of the surface by off-road travel. Additional acreage of the scrub oak, pinyon pine and juniper communities on private land adjacent to streams draining the San Gabriel Mountains would be protected under Alternative D.

Mineral withdrawals under Alternative D would remove the potential threat of fragmentation of Mojave mixed woody scrub in the proposed carbonate endemics ACEC. The same is true for the Coolgardie Mesa and West Paradise Valley conservation areas. Implementation of the CHMS and consultation procedures and CEQA review for these areas, however, may result in the same level of protection from new mining.

The acreage of each natural community that is protected by Alternative D is presented in Table 4-55.

Table 4-55
West Mojave Natural Communities Impacted by Alternative D (In Acres and %)

NATURAL COMMUNITY	TOTAL ACREAGE	EXISTING CONSERVATION		NEW CONSERVATION		TOTAL CONSERVATION		POTENTIAL LOSS	
Alkali seep	59		0		0		0	59	(100)
Alkali sink scrub	10,895	1,014	(9.3)	4,138	(38.0)	5,152	(47.3)	5,743	(52.7)
Big sagebrush scrub	9,601	8,108	(84.5)	1,081	(11.3)	9,190	(95.7)	411	(4.3)
Blackbush scrub	132,603	87,343	(65.9)	7,545	(5.7)	94,888	(71.6)	37,715	(28.4)
Chamise chaparral	28,593		0		0		0	28,593	(100)
Cottonwood-willow riparian forest	11,533	6,793	(58.9)	1,571	(13.6)	8,364	(72.5)	3,170	(27.5)
Creosote bush scrub	4,025,617	459,004	(11.4)	1,320,049	(32.8)	1,779,053	(44.2)	2,246,563	(55.8)
Desert holly scrub	21,716	2,190	(10.1)	17,452	(80.4)	19,641	(90.4)	2,075	(9.6)
Desert wash scrub	34,496	4902	(14.2)	3,518	(10.2)	8,421	(24.4)	26,075	(75.6)
Fan palm oasis	33		0		0		0	33	(100)
Freshwater seep	388		0		0		0	388	(100)
Gray pine-oak woodland	2,678	49	(1.8)		0	49	(1.8)	2,629	(98.2)
Greasewood scrub	3,662		0	1,947	(53.2)	1,947	(53.2)	1,715	(46.8)
Hopsage scrub	6	5	(83.3)	1	(16.7)	6	(100)		0
Interior live oak woodland	589		0		0		0	589	(100)
Jeffrey pine forest	1,811	1,811	(100)		0	1,811	(100)		0
Joshua tree woodland	10,383	4,763	(45.9)	269	(2.6)	5,032	(48.5)	5,351	(51.5)
Juniper woodland	87,167	6,960	(8.0)	1,434	(1.6)	8,395	(9.6)	78,772	(90.4)
Mesquite bosque	7,110	2,491	(35.0)	1,349	(19.0)	3,839	(54.0)	3,271	(46.0)
Mojave mixed woody scrub	689,589	378,795	(54.9)	124,710	(18.1)	503,505	(73.0)	186,084	(27.0)
Mojave riparian forest	4,687	28	(0.6)		0	28	(0.6)	4,659	(99.4)
Montane meadow	966		0		0		0	966	(100)
Montane riparian scrub	2,228	203	(9.1)	238	(10.7)	441	(19.8)	1,787	(80.2)
Native grassland	3,375		0	68	(2.0)	68	(2.0)	3,306	(98.0)
Northern mixed chaparral	992	992	(100)		0	992	(100)		0
Pinyon pine woodland	18,773	12,077	(64.3)	1,171	(6.2)	13,248	(70.6)	5,525	(29.4)
Pinyon-juniper woodland	158,329	84,581	(53.4)	12,022	(7.6)	96,603	(61.0)	61,727	39.0)
Rabbitbrush scrub	7,842	92	(1.2)		0	92	(1.2)	7,750	(98.8)
Scrub oak chaparral	36,385	23,106	(63.5)		0	23,106	(63.5)	13,279	(36.5)
Saltbush scrub	591,713	18,897	(3.2)	218,608	(36.9)	237,505	(40.1)	354,409	(59.9)
Semi-desert chaparral	128,230	3,855	(3.0)	5,156	(4.0)	9,010	(7.0)	119,220	(93.0)
Shadscale scrub	38,602	7,194	(18.6)	31,408	(81.4)	38,602	(100)		0
TOTAL	6,070,651	1,115,253	(18.4)	1,753,734	(28.9)	2,868,987	(47.3)	3,201,664	(52.7)

The table excludes acreage in the GIS database describing landforms (lava, lakes, playas), disturbed lands (agriculture, urban) and disturbed plant communities (non-native grassland, ruderal).

Total in area excludes military lands.

Existing conservation includes ACECs, Wilderness, National Parks, State Parks, CDFG Ecological Reserves.

New conservation includes the HCA for this alternative. Los Angeles County SEAs are excluded.

Potential loss includes areas not under specific conservation and available for development or other use. Actual loss of these communities is dependent on location, development trends and land ownership.

4.5.2.2 Desert Tortoise

Excepting minor differences, Alternative D shares the same impacts associated with Alternatives A and C for the following categories, which for the most part, are not reiterated in Table 4-56: BLM ACEC Management, BLM Management of Category I, II, & III Habitat, Plan Implementation, Federal Permitting, State Permitting, 1% AGD, BLM Management, BLM Land Tenure Adjustment (LTA), Education, Energy & Mineral Development, Feral Dog Management, Guzzlers, Law Enforcement, Commercial Filming, Plant Harvest, Raven Management, Sheep Grazing, and Weed Control.

Table 4-56
Tortoise Impacts of Alternative D

BENEFITS	RESIDUAL IMPACTS
DWMA DESIGNATION AND CONFIGURATION	
Expanded DWMAs • Result in adding 68 mi^2 to Alternative A DWMAs, for a total DWMA size of 2,371 mi^2: • 19 mi^2 of critical habitat to the Fremont-Kramer DWMA, located south of Alternative A's DWMA • 17 mi^2 to the Ord-Rodman DWMA north of the Johnson Valley Open Area, would serve to alleviate potential management conflicts in this undesignated area between the DWMA and open area • 25 mi^2 to Fremont-Kramer DWMA, located north of Highway 58 and between Highway 395 and the Kern County line • 7 mi^2 to the Superior-Cronese DWMA, located between Silver Lakes and Iron Mountains, which would capture some higher density areas, and include 7 mi^2 of BLM managed lands • Only the Iron Mountains expansion would encompass higher density tortoise areas, but all would allow for changes in land management that would begin to recover habitats for eventual repatriation	Expanded DWMAs • Expanding the Fremont-Kramer DWMA to the south would require purchase or conservation management of 18 mi^2 of private lands • Expansion of the Ord-Rodman DWMA would incorporate a rugged mountain that is not particularly suitable tortoise habitat • Expanding the Fremont-Kramer DWMA to the county line west of Highway 395 would encompass 25 mi^2 of marginal habitats that are extremely degraded by sheep grazing; this small area would be isolated from the portion of the DWMA east of Highway 395, as 395 would be fenced; and would require the purchase or conservation management of 5 mi^2 of private land west of Highway 395
Recent and Current Tortoise Occurrence **Includes**: • 2,371 mi^2 (21% of the 2002 range) within *four* DWMAs • Good representation in central part of 2002 range • 427 of 563 mi^2 (76%) of higher density areas • 290 of 424 (68%) observed tortoises • 2,139 mi^2 (97%) of USFWS critical habitat • 856 mi^2 of BLM Category I (96%) and 317 mi^2 of Category II (87%) habitats	Recent and Current Tortoise Occurrence **Does not include**: • 8,763 mi^2 (79%) of the 2002 range • Poor representation in periphery of range • 136 mi^2 (24%) of higher density areas • 134 of 424 (32%) observed tortoises • 65 mi^2 (3%) of USFWS critical habitat • 38 mi^2 of BLM Category I (4%) and 47 mi^2 of Category II (13%) habitats

BENEFITS	RESIDUAL IMPACTS
Land Management Within DWMAs • Installing a fence along the northern boundary of the Pinto Mountains would minimize urbanizing impacts from along the south side of Highway 62. There are no data, however, to indicate that this is a problem; in that area, all higher use impact areas are north of Highway 62	Land Management Within DWMAs • Fencing all boundaries of the Superior-Cronese DWMA would have the positive and negative effects described in Alternatives A and C, and overall would not provide for the intended protection; many of the urbanization impacts would occur inside the fence
Land Management Adjacent to DWMAs • Establishing EMZ's in Brisbane Valley and Copper Mountain Mesa would be useful in determining effects of sheep, OHV use, and urbanization but is questionable given limited funding, which would be better spent in minimizing these impacts where they are known to occur • Establishing translocation sites in Brisbane Valley and portions of the Little San Bernardino Mountains Gilia Habitat Conservation Area would serve as an adaptive management tool to deal with the foreseen event in which too many tortoises are displaced from authorized construction sites	Land Management Adjacent to DWMAs • It is anticipated that the pilot translocation study would be funded as a component of the mitigation of military maneuver programs. In the event that plan participants were required to help fund this program, it could detract from moneys available for other pro-active measures called for by this alternative.
DWMA Configuration Relative to Open Areas • Protective fencing, boundary signing, focused educational outreach, increased law enforcement, etc. would function to minimize impacts of adjacent BLM open areas on DWMA conservation management	DWMA Configuration Relative to Open Areas • DWMA configuration of this alternative is not different from that proposed in Alternative A, so both configurations fail to encompass 119 mi^2 of higher density tortoise areas. There are a total of 67 mi^2 of higher density tortoise areas in the Johnson Valley and Stoddard Valley open areas that are immediately adjacent to the Ord-Rodman DWMA. This alternative fails to encompass these 67 mi^2, which represent 56% of the tortoise concentration areas found outside DWMAs. The inclusion of these tortoise concentrations in the DWMA would have enlarged the Ord-Rodman DWMA, which is about 600 mi^2 smaller than the 1,000 mi^2 size given in the Recovery Plan, and substantially reduced impacts to tortoises both in the adjacent DWMA and inside the open areas
DESIGNATION AND MANAGEMENT OF DWMAS AS ACECS	
Size Relative to the Existing Tortoise ACEC • Net increase of 1,590 mi^2 of public lands in ACECs, which is 40 times larger than the DTNA, at 40 mi^2	Size Relative to the Existing Tortoise ACEC
Compensation & Fee Structure • The additive compensation ratio would not ostensibly affect tortoise conservation, as the "extra" funds would be used for the species occurring in the other HCA that overlaps the DWMA	Compensation & Fee Structure

BENEFITS	RESIDUAL IMPACTS
MULTIPLE USE CLASSES CHANGED TO CLASS L IN DWMAS	
DWMAs Changed to Class L • Changing all Class M and unclassified public lands in DWMAs to Class L would resolve the many potential problems identified in Alternative A, and have the benefits of management associated with Class L over a broader region	DWMAs Changed to Class L
ACEC Prescriptions Supercede Class M and unclassified public lands • Formal ACEC Management Prescriptions, applied to DWMAs, that would provide more protection than existing Class M or unclassified public land guidelines on public lands, include: • No new agriculture, including biosolids fields • No new nuclear and fossil fuel power plants • New routes considered in context of Class L guidelines, thereby limiting agency discretion • Recreational events restricted to approved routes rather than existing routes • No pit, start, finish, or spectator areas allowed in DWMAs	ACEC Prescriptions Supercede Class M and unclassified public lands
PRIVATE LAND ACQUISITION AND PUBLIC LAND DISPOSAL	
Acquisition Priorities • Acquire all private lands in DWMAs (see Alternative C)	Acquisition Priorities • Same as Alternative C
NEW AGRICULTURAL DEVELOPMENT	
New ACEC Management • New ACEC Management Prescription would prohibit agricultural development on BLM Class M and unclassified public lands	New ACEC Management
CONSTRUCTION ACTIVITIES	
Level 1 BMPs and Class L Management • Applying Level 1 BMPs in tortoise Survey Areas outside DWMAs would serve to minimize indirect impacts in all areas, not just DWMAs and SRAs • New Class L designation would not allow construction of new landing strips and airports, and new nuclear and fossil fuel power plants on Class L lands in DWMAs	Level 1 BMPs and Class L Management
DISEASE MANAGEMENT	
Positive Aspects of Alternative • See discussion in Alternative A	Negative Aspects of Alternative

BENEFITS	RESIDUAL IMPACTS
DROUGHT	
Motorized Vehicle Access • Establishing vehicle use, quarantine areas in higher density tortoise areas during drought would serve to alleviate additional impacts to tortoises that are already physiologically stressed due to lack of water and poor nutrition	Motorized Vehicle Access
FIRE MANAGEMENT	
New Fire Management Prescriptions • New prescriptions identified for fire fighting would result in fewer mechanical impacts in DWMAs and higher tortoise density areas, but may also result in larger areas being burned than would occur under current management	New Fire Management Prescriptions
CATTLE GRAZING ON BLM ALLOTMENTS	
Allotment-specific Competitive Threshold Studies • Requiring new studies in the Ord Mountain, Harper Lake, and Cronese Lakes cattle allotments to ascertain allotment-specific competition thresholds would effectively reduce risks associated with the 230 pound threshold (which is based upon studies conducted in the East Mojave). • Applying the interim threshold of 350 pounds until the studies are completed would allow for significantly less ephemeral forage consumption than would occur at the 230 pound threshold. Although the CDCA Plan called for a 350-pound threshold in 1980-designated crucial habitat, that requirement was eliminated by a 1981 plan amendment. Current grazing management employs a 350 pound threshold, but only because this was called for in a 1994 biological opinion. This proposal would require implementation of this management practice on all cattle allotments in DWMAs.	Allotment-specific Competitive Threshold Studies • Impacts given in Alternative A would still occur, but at lower levels due to the relatively higher threshold (i.e., cattle would ostensibly spend less time in Exclusion Zones, which would result in fewer impacts in that critical area). However, the higher threshold would also result in relatively more concentrated cattle use in non-Exclusion Zone areas, which may also comprise tortoise habitat (see more detains in Alternative A)
Earlier Cattle Exclusion Date • Removal of cattle by February 15 (rather than 15 March, as proposed in Alternative A), would result in less forage competition between cattle and juvenile (especially hatchling) tortoises, which may be active in January and February and rely on late winter annuals available in limited supply	Earlier Cattle Exclusion Date • Hatchlings would still be vulnerable to trampling because cattle would only be excluded from the best tortoise habitat through mid-June, and would continue to graze those areas when most tortoise eggs hatch (i.e., late September-October timeframe) and hatchlings are most vulnerable
Protect Riparian Areas • Protecting riparian areas from additional impacts would result in minimal benefits to tortoises; seeps and springs generally occur upslope while most tortoises occur in the flats; and only tortoises in the immediate vicinity are likely to benefit from vegetation growth and free-standing water (i.e., there is no evidence that tortoises migrate back and forth between the flats and slopes to drink from springs)	Protect Riparian Areas

BENEFITS	RESIDUAL IMPACTS
Placement of Cattle Waters • Water placement may lead to better dispersal of cattle, which would incrementally minimize impacts as described above and in Alternative A	Placement of Cattle Waters • See above and Alternative A
OHV Impacts to Cattle • Minimizing OHV impacts to cattle would be an indirect means of protecting tortoises; fencing, signing, law enforcement, and other programs would serve to minimize OHV impacts to tortoises and cattle	OHV Impacts to Cattle
HABITAT CREDIT COMPONENT	
Do Not Implement Program • Removal of the Habitat Credit Component would avoid potential impacts described in Alternative A	Do Not Implement Program
Implement Alternative Program • Proactive program to restore habitats within DWMAs would result in facilitated habitat rehabilitation, although failure to achieve success criteria (see discussion in Alternative A) would undermine the effectiveness of the program	Implement Alternative Program
HEAD STARTING PROGRAM	
Expanded Head Starting Program • Establishing five head starting studies has the obvious disadvantage of cost, but longitudinal monitoring would minimize cost, and would allow successful sites to be continued and unsuccessful sites to be discontinued. • Substantial advantages of replicating studies in different regions would include an ability to compare success and failures in different habitat types, and if successful, would result in release of hatchlings 8 to 10 years sooner than if the pilot study were found to be successful and was followed by constructing multiple nurseries, as would already occur under this alternative	Expanded Head Starting Program

BENEFITS	RESIDUAL IMPACTS
MOTORIZED VEHICLE ACCESS NETWORK	
• See Multiple Use Class and Drought sections above • (AD-33) The closure of identified MAZs in DWMAs (see chapter 2,Table 2-33) to all but street-legal vehicles would have a significant beneficial impact of prohibiting the types of vehicles most likely to drive cross-country (e.g., dirt bikes, dune buggies, etc.) from tortoise conservation areas. This would likely minimize impacts to tortoises, but be particularly important to habitats, which are less likely to be degraded if vehicles remain on roads.	• (AD-33) The intended function of restricting vehicle travel to street-legal vehicles would only be viable if increased law enforcement is present to enforce the new rule. Street-legal vehicles, including 4-wheel drive trucks
RECREATION ACTIVITIES	
Competitive Event Corridors and Dual Sport • Same as Alternative A, except no competitive or organized vehicle events would be allowed in DWMAs, which would eliminate impacts associated with competitive corridors in the Ord-Rodman DWMA and dual sports throughout	Competitive Event Corridors and Dual Sport • All available information indicates that there are very few impacts to tortoises and habitat associated with dual sports and regulated use (i.e., under yellow-flag conditions) of competitive event corridors, while the proposal to eliminate these uses would result in significant effects upon OHV recreation (see discussion below) and undermine public support of the conservation strategy, which is required to be successful
Other Conservation Measures • Restricting *camping* to designated areas would function to concentrate future authorized impacts rather than have them spread out in disturbed areas; would facilitate issuance of citations by law enforcement personnel • Closing multiple *campsites* in favor of one official campsite would allow existing sites to begin recovering in the absence of new camping; would allow focused educational outreach to campers at the official site • Restricting *stopping and parking* to within 15 feet of the centerline of approved routes would result in substantially less vehicle impact than would occur under Alternative A, and may facilitate law enforcement	Other Conservation Measures • Consolidated, BLM-maintained camp site would require additional BLM staff, expenditures, and serve to concentrate people in a single area where indirect impacts to adjacent areas could be more prevalent
Gunshot Impacts • Prohibiting shooting in DWMAs would substantially minimize the number of gunshot mortalities, and allow enforcement personnel to issue citations more effectively	Gunshot Impacts • Would result in substantially less support by the hunting and target practice community, which would be required to facilitate acceptance of the strategy

BENEFITS	RESIDUAL IMPACTS
TRANSPORTATION	
Highway and Road Fencing • Extending a new fence from Highway 395 to the DTNA would substantially reduce OHV impacts from the south into the DWMA, north of Mojave-Randsburg Road • Fencing Shadow Mountain Road would provide for fewer tortoise mortalities, and overall have the same advantages and disadvantages described for Alternative A • Installing fences and underpasses along Fort Irwin Road would avoid tortoise mortalities while providing for movement under the road to lessen habitat fragmentation of the higher density area found there	Highway and Road Fencing • Although fencing Mojave-Randsburg Road would have an overall positive impact, it would entail moving the existing fence south to the road, or alternatively, removing the fence, which in either case would be relatively costly
Caltrans Mitigation Banking • Caltrans mitigation banking would allow Highway 395 to be fenced between 10 and 15 years earlier than would otherwise occur. Given available information[14], this may mean that a few more than 30 tortoises (most of these subadults) would not be crushed per year along Highway 395 from Kramer Junction to the southern boundary of the Fremont-Kramer DWMA, which would constitute a significant beneficial impact	Caltrans Mitigation Banking
UTILITIES	
Require Region-wide Revegetation • Requiring utility companies to revegetate non-access areas throughout the planning area (as opposed to only DWMAs) would facilitate recovery of plant communities on a much wider scale	Require Region-wide Revegetation • Revegetating alignments throughout the ITA would result in recovering habitats that are otherwise identified for take, and would not contribute to overall conservation in DWMAs

Alternative D necessarily places tortoise conservation and recovery as the highest priorities for land management within the expanded DWMAs. In comparing this alternative to Alternatives A and C (the other two most proactive tortoise conservation programs), Alternative D has both major advantages and neutral advantages, as described in the following subparagraphs.

Advantages of Alternative D: One major advantage would be changing multiple use classes from Class M and unclassified to Class L, which have been described in Alternative A as disadvantages associated with that alternative. The new ACEC would be 40 times larger than the existing DTNA, and have advantages similar to those given for Alternatives A and C. Formal ACEC management prescriptions would be substantially more protective for this alternative as they relate to new agriculture, construction (i.e., no new nuclear or fossil fuel power plants), new route designation, and recreation. These potentially significant impacts are not addressed by Alternatives A and C. Applying Level 1 BMPs throughout all higher concentration areas would be more protective, and address more indirect impacts, than restricting them to DWMAs and

[14] Dr. Boarman estimated that about 1.5 tortoises/linear mile/year were crushed along Highway 395 south of Kramer Junction. The fenced area would be about 22 linear miles, so a total of about 33 tortoises may be expected to be crushed along this length of Highway 395 *each year* until it is fenced.

SRAs, as given in Alternative A. Establishing vehicle quarantine areas in higher concentration areas during drought would be substantially more protective, and significantly augment the limited number of things that can be done relative to drought. Studies to determine local and regional competition thresholds between tortoises and cattle would avoid many of the impacts associated with applying the East Mojave threshold in the planning area. Earlier exclusion area dates (i.e., February 15 instead of March 15) would predictably benefit hatchling tortoises in minimizing competition for limited annual plant growth in the late winter, early spring time frame.

The head starting and fencing programs may be even more significant than the advantages listed above. The expanded head-starting program would be a major advantage, in an attempt to repopulate areas that have been substantially extirpated by older die-off regions north of Highway 58 in the Fremont-Kramer DWMA. Another very significant advantage would be fencing Highway 395 south of Kramer Junction 10 to 15 years prior to construction. Available data suggest that more than 300 tortoises, particularly subadults, would be saved from vehicle crushing if the 22-mile stretch of Highway 395 is fenced shortly after plan adoption instead of 10 years later.

Marginal or Neutral Advantages of Alternative D: Although the Alternative A and C DWMAs would be expanded by 68 mi^2, the protection provided by this expansion would be marginal, for reasons given in the table. Erecting a fence along Highway 62 to preclude urbanizing impacts from the north into the Pinto Mountain DWMA would have little or no benefit. Establishing Experimental Management Zones to study effects of sheep grazing, recreation, and urbanization on tortoises in the Brisbane Valley and Copper Mountain Mesa areas would have marginal benefits, if any, to tortoise conservation in the expanded DWMA; limited funds would be better spent implementing protective measures in the DWMA. Protecting riparian areas would do little to enhance tortoise conservation. Potential impacts associated with the habitat credit component would be avoided under this alternative. Minimizing the camping, stopping, and parking distances from approved routes would provide slightly more protection, but this would not likely be substantial.

4.5.2.3 Mohave Ground Squirrel

Alternative D would implement protective measures identified similar to those of Alternatives A and C for both the tortoise and MGS, and is intended to provide for enhanced MGS conservation on both public and private lands. The analysis is meaningful, as most of the measures were identified for the tortoise, and this is an opportunity to see if enhanced tortoise protection would extend to the MGS. The MGS CA and two DWMAs would be expanded, as described in the table.

Similar impacts given for the tortoise and/or MGS (mostly in Alternative A for the two species) would affect the following programs where the two species ranges coincide: DWMA Management within the MGS CA; Los Angeles County Significant Ecological Area; Sierra Foothills Habitat Connector; Species-specific Conservation Areas; Incidental Take

Authorization; 1 % Allowable Ground Disturbance; Category I, II, & III and Critical Habitats for Tortoises; Conservation Relative to Military Bases; Commercial Filming and Plant Harvest; Dump Removal and Waste Management; Education; Feral Dog Management Plan; Law Enforcement; Mining; Raven Management Plan; Utilities Construction and Maintenance; Competitive Events; Non-competitive Events (Dual Sports); Presence-Absence Surveys; Highway Fencing and Culverts; Road Maintenance; and Monitoring.

Table 4-57 reports only those benefits and residual impacts as they relate to MGS conservation that are different from the impacts identified under Alternatives A and C for the tortoise and MGS. As such, the programs listed above are not reiterated in Table 4-48.

Table 4-57
Mohave Ground Squirrel Impacts of Alternative D

BENEFITS	RESIDUAL IMPACTS
Conservation Area Size of Conservation and Incidental Take Areas • (AD-1) Reconfiguring the Fremont-Kramer DWMA to encompass existing critical habitat between Shadow Mountain Road and the El Mirage Open Area would result in heightened protection for 19 mi^2, and represent a marginal beneficial impact on a regional level. • (AD-1)The additional reconfiguration northwest of Kramer Junction, between Highway 395 and the Kern County line, would constitute a marginal benefit to MGS conservation, as the area is extremely impacted by on-going sheep grazing. Only 2 of 252 MGS records were reported for this area.	Conservation Area Size of Conservation and Incidental Take Areas
Management Structure within the MGS CA Compensation and Fee Structure • (AD-4) The additive mitigation fee would provide for more conservation where the MGS CA overlaps with DWMAs and conservation areas for other species. Rather than collecting fees solely for MGS management, there would be additive fees that could be applied separately for MGS conservation and other species. Given anticipated short falls to implement conservation measures, and the likelihood that tortoise and other federally listed species may receive higher priority than the State-listed MGS, the additive fees (depending on how they are expended) would constitute a significant beneficial impact.	Management Structure within the MGS CA Compensation and Fee Structure
Management Structure within the MGS CA Best Management Practices • (AD-8) As described above, applying BMPs within the two DWMAs and the MGS CA would serve to minimize direct impacts.	Management Structure within the MGS CA Best Management Practices • (AD-8) BMPs would have little efficacy in avoiding indirect impacts.

BENEFITS	RESIDUAL IMPACTS
Management Structure within the MGS CA HMP Instead of ACEC Designation • (AD-2) Designating this area as an ACEC would constitute a very significant beneficial impact, compared to managing the area in the context of Wildlife Habitat Management Area. Benefits would be similar to those given for the tortoise in Alternative A, relative to designating the DWMAs as ACECs.	Management Structure within the MGS CA HMP Instead of ACEC Designation
Management Structure within the MGS CA Multiple Use Class Designations • (AD-3) Reclassifying all BLM multiple use class M lands within the CA to class L would constitute a significant beneficial impact, and avoid the types of impacts identified relative to Alternative A for the tortoise. • (AD-9) Applying additional restrictions on public lands to replace CDCA multiple use guidelines on class M and unclassified lands would provide limited additional protection to the MGS, as most of the two DWMAs and the MGS CA are already within class L habitats, where new agriculture, construction, routes, competitive events, and organized non-competitive events are already restricted.	Management Structure within the MGS CA Multiple Use Class Designations
Miscellaneous Conservation Programs Fire Management • (AD-10) The expanded fire management practices identified in Chapter 3 would each provide for relatively more protection in the two DWMAs and benefit MGS and their habitats where wildfires are fought.	Miscellaneous Conservation Programs Fire Management
Miscellaneous Conservation Programs Habitat Credit Component • (AD-5) Not including the habitat credit component would avoid the potential impacts identified for this program in Alternative A for the tortoise. The intent to restore habitats within the MGS CA and two DWMAs would benefit the MGS by beginning to regain habitats lost to or degraded by previous human uses. Habitat Reclamation and Restoration • (AD-8) Restoring habitats, rather than reclaiming them, would benefit MGS, as described above in other alternatives with similar prescriptions.	Miscellaneous Conservation Programs Habitat Credit Component Habitat Reclamation and Restoration
Miscellaneous Conservation Programs Land Acquisition • (AD-13) The long-term land acquisition goal to acquire all private lands within the two DWMAs for tortoise conservation from willing sellers would have the positive effect of minimizing habitat fragmentation, depending on the uses allowed by the BLM.	Miscellaneous Conservation Programs Land Acquisition • (AD-13) Windmill alignments, new open areas, large-scale development (e.g., Venture Star or military expansion), and similar developments could result in habitat fragmentation that would significantly detract from MGS conservation.

BENEFITS	RESIDUAL IMPACTS
Miscellaneous Conservation Programs Mining	Miscellaneous Conservation Programs Mining • (AD-20) Mineral withdrawals would be appropriate for "source areas," but the alternative fails to identify other uses that should also be assessed for removal (i.e., grazing, intense OHV use and recreation, large-scale developments).
Miscellaneous Conservation Programs Signing and Fencing DWMAs • (AD-11) As described, the expanded fencing program identified for the two DWMAs relative to the tortoise would provide some, but likely little, benefit to MGS conservation.	Miscellaneous Conservation Programs Signing and Fencing DWMAs
Livestock Grazing • (AD-27, AD-32) Funding an Avery-Ivanpah study on the Harper Lake Allotment would not benefit MGS conservation, per se, as the intent would be to determine competition between cattle and tortoises. Given "boom and bust" cycle of the MGS, it may not be possible to design a similar competition study to determine interactions between cattle and the MGS. In any case, the intent to use a threshold of 350 lbs/acre would more benefit the MGS than other alternatives identifying 200 or 230 lbs/acre. • (AD-28) The intent to remove cattle from Exclusion Areas by February 15 rather than March 15 would have conservation value for the MGS, as it typically emerges from hibernation before tortoises, and any competition that may occur would be reduced under the earlier date. • (AD-1) Removal of sheep grazing from 14 mi^2 would be one of the more significant beneficial impacts of expanding the Fremont-Kramer to the south into critical habitat excluded in Alternative A. There were no MGS records from this area, though it is fully within the range. • (AD-1) The additional reconfiguration northwest of Kramer Junction, between Highway 395 and the Kern County line, would allow sheep grazing to be discontinued, which would constitute a significant beneficial impact. Two of 252 records occurred in area.	Livestock Grazing

BENEFITS	RESIDUAL IMPACTS
Motorized Vehicle Access • The motorized vehicle access network proposed for Alternative A would be implemented under Alternative D and have the same beneficial impacts identified above. • (AD-33) Based on available data, requiring additional motorized vehicle access restrictions in the following MAZ's would predictably benefit MGS conservation: (a) Little Dixie Wash area: El Paso SS2, and the non-MAZ area north of the El Paso Mountains Wilderness Area, between Ridgecrest SS1 and El Paso SS2. (b) Cuddeback Dry Lake/Pilot Knob area: Red Mountain SS3 and SS4. And (c) Coolgardie Mesa/Superior Valley area: Superior SS3 and SS5. • (AD-35) During periods of prolonged drought (lasting three or more years), the BLM would consider emergency route closures (generally referred to as "quarantine areas") in the following potential MGS concentration areas (would apply to the MAZs given above): (a) Little Dixie Wash area, between the Sierra Nevada and Ridgecrest/Inyokern; (b) Cuddeback Dry Lake/Pilot Knob area; (c) Coolgardie Mesa/Superior Valley area. • Such quarantines would be lifted immediately following break of the drought, which would be identified by the Implementation Team in coordination with BLM, USFWS, and CDFG.	Motorized Vehicle Access • (AD-33, AD-35) Closure of other areas would likely benefit MGS conservation, but there are insufficient data to determine where such areas may be located.
Recreation Hunting and Shooting • (AD-7) Prohibitions with regards to general shooting other than hunting would constitute a marginal benefit to the MGS, which may not be particularly affected by this prescription.	Recreation Hunting and Shooting
Recreation Stopping, Parking, and Camping • (AD-6) Advantages identified above relative to reduced widths for stopping and parking; restricting camping to designated areas; consolidating multiple camp sites into one official BLM-managed campground; and distribution of education materials relative to the MGS, all are concomitantly more beneficial to MGS conservation than programs identified in other alternatives.	Recreation Stopping, Parking, and Camping
Surveys Exploratory Surveys • (AD-20) Conducting programmatic surveys in potential habitat areas would help develop a better MGS range map, and would constitute a significant beneficial impact if MGS are found outside the known range. As described in Chapter 3, trapping surveys are the only means to determine if the range is larger (or smaller) than expected. • (AD-20) Identifying and protecting "source areas" (if they exist) would be extremely important to MGS conservation, as it would allow for restrictive management to protect these drought refugia.	Surveys Exploratory Surveys • Spending limited funding on these surveys may detract from implementing conservation measures. Nor is there any guarantee that negative trapping results in one to several seasons would definitively show that the MGS is absent from survey areas. As such, it may be cost prohibitive to survey these areas over a five or six year period to conclusively say that the MGS is absent.

BENEFITS	RESIDUAL IMPACTS
Surveys Surveys for Other Species • (AD-21) Performing burrowing owl surveys on all project sites within the MGS range may allow for detection of the MGS, although the likelihood is slim. Habitat characterization and other data could be used by the CDFG for sites within the range to determine the quality and potential occupancy of habitats being lost. These would represent marginal benefits to overall MGS conservation.	Surveys Surveys for Other Species

Alternative D has the same advantages and disadvantages described for Alternative A, with two major exceptions: the MGS CA would be designated as an ACEC and all multiple use classes would change to class L. Alternative D is the only one that would result in ACEC management throughout the MGS CA, which make it the most protective of the seven alternatives. Changing all public lands to class L results in about 580 mi^2 more class L than any other alternative.

4.5.2.4 Bats

Impacts to bats under Alternative D would be as described for Alternative A.

4.5.2.5 Other Mammals

Bighorn Sheep: Retention of the open space corridor west of Lucerne Valley would provide additional benefit for bighorn that occasionally move between the Granite Mountains and the San Bernardino Mountains. Restriction on travel in the Newberry-Rodman MAZ area to street legal vehicles may have a small additional beneficial impact to bighorn.

Mojave River Vole: Impacts to the Mojave River vole under Alternative D would be as described for Alternative A.

Yellow-eared Pocket Mouse: Establishment of a grazing exclosure in occupied habitat in the eastern Sierra canyons (e.g. Sand Canyon) would allow a better determination of the potential effects of grazing on yellow-eared pocket mouse.

4.5.2.6 Birds

For the following birds, impacts would be the same as described for Alternative A except as noted below for route designation: Bendire's thrasher, Brown-crested flycatcher, ferruginous hawk, golden eagle, Inyo California Towhee, LeConte's thrasher, long-eared owl, prairie falcon, southwestern willow flycatcher, summer tanager, vermilion flycatcher, western snowy plover, western yellow-billed cuckoo, yellow-breasted chat, and yellow warbler.

The restrictions within certain MAZ areas to street-legal vehicles only would provide a small additional benefit to golden eagle and prairie falcon and a substantial additional benefit to Bendire's thrasher and LeConte's thrasher compared to Alternative A.

Burrowing Owl: Surveys required for discretionary permits under Alternative D would provide positive evidence of presence or absence of burrowing owls on project sites. This is most likely to result in additional detections and better burrowing owl protection than under Alternative A or the existing situation. The restrictions within certain MAZ areas to street-legal vehicles only would provide a substantial additional benefit to burrowing owls compared to Alternative A.

Gray Vireo: Establishment of open space surrounding the drainages from the San Bernardino and San Gabriel Mountains would provide a small amount of additional open space within the habitat for gray vireo. This beneficial impact is not likely to be effective in increasing protection for this bird from adjacent rural residences, however, and the overall impacts of Alternative D to this specie would be the same as Alternative A.

4.5.2.7 Reptiles

Establishment of additional open space surrounding the drainages from the San Gabriel and San Bernardino Mountains would have a beneficial impact on the San Diego horned lizard compared to Alternative A because additional habitat would be protected. This measure would not eliminate edge effects of rural development, including collection by children or mortality by vehicles.

Impacts would be as described for Alternative A for the following species Panamint alligator lizard and southwestern pond turtle. The Mojave fringe-toed lizard would receive a substantial benefit compared to Alternative A because of the restrictions in certain MAZ areas to street-legal vehicles.

4.5.2.8 Plants

The higher mitigation ratio within conservation areas where covered species have overlapping distributions may serve as a disincentive to development, which would primarily benefit rare plants within the DWMAs. The magnitude of this benefit is not expected to be substantial. Even with the higher mitigation ratio required where several covered species occur together, the most likely outcome would be higher fees without a guarantee of better protection for the plant species.

Most projects require specific locations. For projects on public land that have discretion with respect to location and can be moved away from overlapping distributions of species, this alternative would result in better protection for those species.

For the following plants, impacts would be the same as described for Alternative A, except as noted below for route designation: alkali mariposa lily, Barstow woolly sunflower, crucifixion thorn, desert cymopterus, flax-like monardella, Kelso Creek monkeyflower, Kern buckwheat, Lane Mountain milkvetch, Little San Bernardino Mountains gilia, Mojave monkeyflower, Mojave tarplant, Parish's alkali grass, Parish's phacelia, Parish's popcorn flower, Red Rock poppy, Red Rock tarplant, Reveal's buckwheat, Salt Springs checkerbloom and triple-ribbed milkvetch.

Restrictions in certain MAZ areas to street-legal vehicles would be substantially more beneficial than Alternative A for the following plants: Barstow woolly sunflower, crucifixion thorn, desert cymopterus, Lane Mountain milkvetch, and Parish's phacelia.

Carbonate Endemic Plants: Withdrawal of the Carbonate Endemic Plants ACEC from mining would provide a more certain guarantee that these species would be protected from adverse impacts of mining. The 3089 regulations governing mining plans allow BLM the discretion to deny proposals that would result in jeopardy to the species, so the protection is one of regulatory certainty rather than on-the-ground conservation.

Charlotte's Phacelia: Alternative D would be far more beneficial to this species because of the exclusion of cattle grazing during the growth period.

Ninemile Canyon Phacelia: Alternative D would be far more beneficial to this species because of the exclusion of cattle grazing during the growth period.

Shockley's Rock Cress: Withdrawal of the Carbonate Endemic Plants ACEC from mining would provide a more certain guarantee that these species would be protected from adverse impacts of mining. The 3089 regulations governing mining plans allow BLM the discretion to deny proposals that would result in jeopardy to the species, so the protection is one of regulatory certainty rather than on-the-ground conservation.

Short-joint Beavertail Cactus: Establishment of additional open space surrounding the drainages from the San Gabriel and San Bernardino Mountains would have a beneficial impact on the short-joint beavertail cactus. Many individuals are expected to remain and survive in place within this open space.

White-margined Beardtongue: Changes in the multiple use classes from M to L on lands south of the Cady Mountainswould apply stricter land use standards of the CDCA Plan. These standards affect specific provisions of grazing facilities, competitive recreation events, land tenure adjustment and placement of electrical generation and distribution facilities. Application of the Class L standards would generally be a beneficial impact relative to Alternative A, though the demand for land use permits and activities on public lands in this area is low.

4.5.3 Socio-Economics

4.5.3.1 Livestock Grazing

Impacts would be as described for Alternative A, except as discussed below.

Cattle Grazing In Tortoise Habitat and MGS Conservation Area: New management prescriptions would require BLM to prevent any further damage to identified riparian areas on all cattle allotments, including Round Mountain. BLM would also take an aggressive look at the best placement of new water developments (and established water developments that could be re-designed or re-located) to facilitate other management actions (e.g. establishment of exclusion zones) and minimize impacts on all covered species. These proposed management actions are necessary to ensure compliance with the proposed Regional Public Land Health Standard for Riparian/Wetland and Stream Function. This may result in the modification of existing cattle operations in the planning area. Due to funding limitations, the necessary modifications would have to be prioritized and scheduled over a four to six year period. These changes in grazing management actions are already being implemented on some allotments (such as Walker Pass).

Cattle Grazing in DWMAs: New management prescriptions would require BLM to fund a study of tortoise nutritional ecology in relation to livestock grazing in three DWMA allotments (Harper, Ord, and Cronese Lake) to determine the applicability of the 230 lbs/acre threshold to the western Mojave Desert. Until that determination is made, cattle would not be authorized to graze until 350 lbs/acre of ephemeral production occurs. This type of management prescription would essentially end cattle grazing in the planning area. Cattle grazing would not occur until ephemeral production exceeds 350 lbs/acre, and this production would have to be achieved by February 15th, rather than March 15th as prescribed under Alternative A. In a typical year with late winter/early spring precipitation the germination of most annual species occurs by February 15th, but meaningful production does not occur until the period between mid-February and mid-March. Consequently, in most years cattle grazing would be unlikely to occur between February 15th and June15th in any of these three allotments.

Sheep Grazing in MGS and Mojave Monkeyflower Conservation Areas: Ephemeral sheep grazing in the MGS Conservation Area would not occur until ephemeral production exceeds 350 lbs/acre, rather than the 230 lbs/acre threshold of Alternative A. The increase in the production turnout threshold from 230 lbs/acre to 350 lbs/acre, however, would not result in any meaningful impact to most of the ephemeral sheep operations. Generally, they would not incur the expense of shipping their sheep from Bakersfield to the desert unless there is at least 350 to 400 lbs/acre of ephemeral forage awaiting them.

No sheep grazing would occur after May 15th. This provision would add additional burdens to most of the ephemeral sheep operations. For many of the operations, the use of the desert's ephemeral forage base is only a part of an annual cycle that includes transporting the sheep from the desert to perennial forage on the Inyo National Forest for the summer. Often, the Forest Service does not authorize sheep grazing until early June. This may mean that sheep

operators would be forced to move their herds onto adjacent private land until Forest Service allotments are ready. The risk of trespass on these private lands would increase, if permission were not obtained from the landowners. This provision would ensure that sheep and Mohave ground squirrels would not be in competition for perennial forage, especially for shrub species.

4.5.3.2 Mineral Development

Mining under Alternative D would be very similar to Alternative A. The requirement for access restoration, in addition to discouraging exploration by smaller companies due to higher operation costs, would result in a longer span of time before reclamation would be complete and the operator released from the period of liability.

4.5.3.3 Recreation

Alternative D shares many of the same impacts on the motorized route network as Alternative A. Alternative D does have a number of unique management prescriptions that cause it to differ substantially from Alternative A. Some of these management prescriptions will affect the designated open motorized route network and various recreational and commercial opportunities that are dependent upon motorized access.

During periods of drought vehicle use quarantine areas would be established. These quarantine areas would be established with the intent of alleviating additional impacts to tortoises that are already physiologically stressed due to lack of water and poor nutrition. The precise impact of these quarantines upon vehicular use of the motorized route network and recreational and commercial activities is unpredictable, but is likely to be very profound. Both the length and geographical extent of the quarantine would be defined at the time the quarantine is imposed, which would be dictated by the severity and extent of the drought. The direct effects of this quarantine would be the lack of vehicular access to potentially vast areas. The indirect effects of quarantine are also likely to be profound, as major shifts in recreational activity would occur, resulting in a much more intensive and concentrated use of non-quarantine areas. This in turn could lead to increased visitor conflicts, route proliferation in these "spill over" areas and increased resource damage.

Under this alternative non-street legal or "Green Sticker" vehicles would be restricted from entering several Motorized Access Zones, due to the presence of sensitive tortoise populations or habitat. This would immediately reduce the number of recreational opportunities currently available to dune buggies, rails, quads, ATCs, and dirt bikes. As a result these vehicles would increasingly use areas outside of these restricted MAZs. This shift would tend to be from landscapes characterized by "bajadas and washes" to more mountainous terrains (i.e. with slopes greater than 20% slope and/or with elevations in excess of approximately 3500 feet). In addition, there is likely to be much more intensive and concentrated use of such "spill-over" areas as the Open Areas, the El Pasos, and portions of the Red Mountain and Fremont sub regions. This in turn could lead to increased visitor conflicts and route proliferation "spill over" areas.

4.5.4 Cultural Resources

Reduction of corridors along routes for stopping and parking and designating specific camping areas could reduce impacts to cultural resources within the DWMAs. Reduction of "general" shooting and target shooting may reduce impacts to certain types of cultural resources that are used as targets or vandalized by shooters. Restricting recreational events to "approved" routes rather than "existing" routes could reduce impacts to cultural resources along existing routes. Moving pit areas, start areas, and other support sites outside DWMAs may reduce impacts to cultural resources inside DWMAs but may increase impacts to resources outside DWMAs if these activities move to other areas. Since habitat conservation strategies and the motorized vehicle access network would be the same as Alternative A, impacts would be the same as those identified in Alternative A.

4.5.5 Cumulative Impacts

Other Species: Alternative D would have fewer cumulative impacts to biological resources because of the restrictions on green sticker vehicles within the DWMAs and the emergency closures in response to drought. These measures would reduce degradation of the habitat from off-road travel both during normal years and drought years.

Increased vigilance with respect to grazing on public lands (measures AD-28, AD-29 and AD-32) would allow greater production of annual plants in areas grazed by cattle, would provide greater benefit to the riparian habitat in the east Sierra canyons, and would reduce degradation of all areas grazed by sheep in the MGS conservation area. Rare plant species benefiting from these measures include Charlotte's phacelia, desert cymopterus and potentially Red Rock tarplant and Red Rock poppy. The riparian birds in the east Sierra canyons may benefit from increased understory and growth of saplings of canopy trees.

When placed in context of other developments within the DWMAs, east Sierra canyons and MGS conservation area that may cumulatively impact the habitat, the reduction in surface disturbance by the additional restrictions on vehicle use and grazing would be more beneficial than measures of Alternative A.

Livestock Grazing: Similar to Alternative A.

Minerals: The cumulative impacts would be similar to those of Alternative A, with the additional negative impact resulting from the high costs needed to restore access routes for mining exploration. The stringent reclamation standards imposed by the NPS for mines absorbed by the CDPA coupled by those required by this alternative for the 2.2 million acres of conservation areas would make exploration and mining more costly to the industry I'm not sure that an action completed in 1994 qualifies for the discussion of cumulative impacts now.

Recreation: Cumulative effects would be significant. Specifically, the closure of vast areas of the western Mojave Desert to non-street licensed vehicles would result in a dramatic shift in use patterns. Users of most motorcycles, ATV's, quads and dune buggies would have to move their activities elsewhere. These uses would be displaced to areas area where non-street licensed vehicle are allowed, including the more mountainous zones, lands outside of the DWMAs, OHV Open Areas and the NEMO and NECO planning areas. Because so many recreational groups currently visiting this planning area own and would continue to want to use their non-street legal vehicles, the number of individuals who shift their recreational location would be substantial. This could lead to increased concentration of such uses, which would significantly decrease the opportunity for a "remote" experience, even in the NEMO and NECO planning areas, and would increase the level of conflict between different recreational.

4.6 ALTERNATIVE E: ONE DWMA, ENHANCED RECREATION

4.6.1 Air Quality

See Alternative A above, except as specifically noted below.

The expanded motorized vehicle recreation proposed in Alternative E would result in increased emissions of particulate mater including PM_{10}. Estimates of emissions from this type of activity requires inputs on the number of additional miles traveled on unpaved roads, the type of vehicle and the speed of the vehicle in addition to the amount surface area exposed to wind erosion. Estimates for most of these factors are not available. A rough estimate of the wind erosion emissions from the proposed Fremont Recreation Area can be derived from MDAQMD inventory data. They show the Spangler Hills Open Area has approximately 300 miles of roads. Using the MDAQMD average widths and emission factors, the Spangler Hills area could emit around 900 tons of PM_{10} per year as a result of wind erosion. As the Fremont Recreation Area's size is similar, comparable wind erosion figures could be expected. Additional emissions could be expected from vehicle travel in the other expanded open areas (Spangler Hills and Johnson Valley) and the additional open vehicle routes proposed.

A small portion of the proposed expansion area for the Spangler Hills Open Area would be within Kern County. This area is not within a federal PM_{10} nonattainment area. The remaining proposed OHV use expansion is within the Mojave Desert PM_{10} Federal nonattainment Area. The SIP for this area was rejected by the USEPA and is currently being revised along with the implementing rules. The rejected SIP and the proposed new rules require the application of control measures and the development of a BLM dust control plan. The new proposed rules would have emission budgets for BLM lands with possible reductions. It is unlikely that Alternative E could meet the budget or dust control rules.

Cumulative Impacts: Most of the proposed increased OHV activity and disturbed ground would occur within the Mojave Desert PM_{10} Federal Nonattainment Area. The activity would result in increased concentrations of PM_{10} in the atmosphere. The increased

concentrations combined with the existing PM_{10} emissions in the Mojave Desert PM_{10} Plan Area could result in violations of NAAQS.

Significance: Alternative E would result in significant negative impacts on air quality. It could cause or contribute to new violations of the National Ambient Air Quality Standards, increase the frequency or severity of existing violations of NAAQS and/or delay timely attainment of the NAAQS. The activity does not conform to the applicable implementation plan (federal conformity). In addition, the MDAQMD significant thresholds for particulate Matter (PM_{10}) of 15 tons per year would be exceeded. It is unlikely that the expected impacts could be mitigated to less than significant.

Conformity Analysis and Conclusions: Federal conformity rules require that federal managers make a determination that a proposed activity conforms to the implementation plan and not cause or contribute to new violations of the NAAQS, increase the frequency or severity of existing violations of NAAQS and/or delay timely attainment of the NAAQS. Alternative E as proposed could not be approved because it does not conform and the impacts cannot be mitigated to conform or be reduced to less than significant.

4.6.2 Biological Resources

4.6.2.1 Natural Communities

Impacts to natural communities under Alternative E would be as described for Alternative A, except as follows:

- A greater level of degradation to creosote bush scrub, saltbush scrub, desert wash scrub and Mojave mixed woody scrub would result from expansion of the Open Areas, creation of the Fremont Recreation Area and inclusion of the enduro corridor.
- The lava and sand fields near Pisgah Crater would become somewhat more degraded by inclusion of the Barstow to Vegas race corridor, depending on the ultimate alignment.

The acreage of each natural community that is protected by Alternative E is presented in Table 4-58.

Table 4-58
West Mojave Natural Communities Impacted by Alternative E (In Acres and %)

NATURAL COMMUNITY	TOTAL ACREAGE	EXISTING CONSERVATION		NEW CONSERVATION		TOTAL CONSERVATION		POTENTIAL LOSS	
Alkali seep	59	0		0		0		59	(100)
Alkali sink scrub	10,895	1,014	(9.3)	4,135	(38.0)	5,149	(47.3)	5,746	(52.7)
Big sagebrush scrub	9,601	8,108	(84.5)	837	(8.7)	8,945	(93.2)	655	(6.8)
Blackbush scrub	132,603	87,343	(65.9)	4,497	(3.4)	91,840	(69.3)	40,763	(30.7)
Chamise chaparral	28,593	0		0		0		28,593	(100)
Cottonwood-willow riparian forest	11,533	6,793	(58.9)	1,571	(13.6)	8,364	(72.5)	3,170	(27.5)
Creosote bush scrub	4,025,617	459,004	(11.4)	1,058,864	(26.3)	1,517,868	(37.7)	2,507,749	(62.3)
Desert holly scrub	21,716	2,190	(10.1)	17,452	(80.4)	19,641	(90.4)	2,075	(9.6)
Desert wash scrub	34,496	4,902	(14.2)	1,893	(5.5)	6,795	(19.7)	27,700	(80.3)
Fan palm oasis	33	0		0		0		33	(100)
Freshwater seep	388	0		0		0		388	(100)
Gray pine-oak woodland	2,678	49	(1.8)	0		49	(1.8)	2,629	(98.2)
Greasewood scrub	3,662	0		1,947	(53.2)	1,947	(53.2)	1,715	(46.8)
Hopsage scrub	6	5	(83.3)	1	(16.7)	6	(100)	0	
Interior live oak woodland	589	0		0		0		589	(100)
Jeffrey pine forest	1,811	1,811	(100)	0		1,811	(100)	0	
Joshua tree woodland	10,383	4,763	(45.9)	269	(2.6)	5,032	(48.5)	5,351	(51.5)
Juniper woodland	87,167	6,960	(8.0)	1,434	(1.6)	8,395	(9.6)	78,772	(90.4)
Mesquite bosque	7,110	2,491	(35.0)	1,349	(19.0)	3,839	(54.0)	3,271	(46.0)
Mojave mixed woody scrub	689,589	378,795	(54.9)	112,641	(16.3)	491,436	(71.3)	198,153	(28.7)
Mojave riparian forest	4,687	28	(0.6)	0		28	(0.6)	4,659	(99.4)
Montane meadow	966	0		0		0		966	(100)
Montane riparian scrub	2,228	203	(9.1)	238	(10.7)	441	(19.8)	1,787	(80.2)
Native grassland	3,375	0		68	(2.0)	68	(2.0)	3,306	(98.0)
Northern mixed chaparral	992	992	(100)	0		992	(100)	0	
Pinyon pine woodland	18,773	12,077	(64.3)	1,171	(6.2)	13,248	(70.6)	5,525	(29.4)
Pinyon-juniper woodland	158,329	84,581	(53.4)	12,022	(7.6)	96,603	(61.0)	61,727	39.0)
Rabbitbrush scrub	7,842	92	(1.2)	0		92	(1.2)	7,750	(98.8)
Scrub oak chaparral	36,385	23,106	(63.5)	0		23,106	(63.5)	13,279	(36.5)
Saltbush scrub	591,713	18,897	(3.2)	218,872	(37.0)	237,769	(40.2)	354,144	(59.8)
Semi-desert chaparral	128,230	3,855	(3.0)	5,156	(4.0)	9,010	(7.0)	119,220	(93.0)
Shadscale scrub	38,602	7,194	(18.6)	31,418	(81.4)	38,602	(100)	0	
TOTAL	6,070,651	1,115,253	(18.4)	1,475,835	(24.3)	2,591,088	(42.7)	3,479,563	(57.3)

The table excludes acreage in the GIS database describing landforms (lava, lakes, playas), disturbed lands (agriculture, urban) and disturbed plant communities (non-native grassland, ruderal).

Total in area excludes military lands.

Existing conservation includes ACECs, Wilderness, National Parks, State Parks, CDFG Ecological Reserves.

New conservation includes the HCA for this alternative. Los Angeles County SEAs are excluded.

Potential loss includes areas not under specific conservation and available for development or other use. Actual loss of these communities is dependent on location, development trends and land ownership.

4.6.2.2 Desert Tortoise

The single DWMA of this alternative would comprise 1,118 mi^2, including the southern portion of the Fremont-Kramer DWMA east of Highway 395 and much of the Superior-Cronese DWMA, and would not include either the Ord-Rodman or Pinto Mountain DWMAs associated with Alternative A. The single DWMA would be managed somewhat more restrictively than those of Alternative A, and enhanced recreational opportunities would prevail outside the DWMA. The benefits and residual impacts discussed in Table 4-59 and afterwards would likely result.

Alternative E is substantially different from most other alternatives, but shares the following benefits and residual impacts with Alternative A: Education Program, Energy & Mineral Development, Plant Harvest, and Weed Control.

Table 4-59
Tortoise Impacts of Alternative E

BENEFITS	RESIDUAL IMPACTS
DWMA DESIGNATION AND CONFIGURATION	
Pinto Mtn. DWMA Excluded • Exclusion of the Pinto Mountain DWMA would be somewhat minimized by the following factors: • Joshua Tree National Park manages 326 mi^2 of tortoise habitat within the planning area, including all contiguous areas east, west, and south of the excluded Pinto Mtn. DWMA, so similar habitats would still be proactively managed, and not subject to impacts associated with BLM's multiple-use mandate • Excluded area is relatively isolated, having no above average human disturbance polygons; except for mining impacts in the local Dale Mining District, the DWMA is relatively undisturbed and likely to remain so over the next 30 years • Excluded area is comprised of 157 mi^2 of public lands, and is therefore not susceptible to urbanizing impacts as occur on private lands. It is significant that 170 mi^2 of 183 mi^2 in the Pinto Mtn. DWMA are • Exclusion would not affect any identified regions of higher tortoise densities	Pinto Mtn. DWMA Excluded • No representative parts of the Southern Mojave that are ecotonal with the Colorado Desert would be managed for proactive tortoise conservation by the BLM, which detracts from region-wide tortoise protection on public lands. Representative plant communities, not found elsewhere within the planning area, would be excluded • Although the 2001 encounter rate of distance sampling was relatively low, suggesting low population densities, Pinto Mtn. was also the one DWMA surveyed in the West Mojave with the fewest carcasses, and no evidence of catastrophic die-offs, so the population has apparently not been affected in this manner, and may be relatively stable. • Only 13 of 424 (3%) of the tortoises observed in recent surveys had clinical symptoms of URTD or cutaneous dyskeratosis, but none was observed in the Pinto Mtn. area. • If the die-offs observed in the late 1980's at the DTNA and more recently throughout the Superior-Cronese DWMA are due to URTD, excluding the Pinto Mtn. DWMA would constitute a significant adverse impact to region-wide tortoise conservation, as it would have served as a relatively disease-free refugium • The Pinto Mtn. and JTNP areas, combined, would have comprised about 1,000 mi^2, which is the target size for tortoise conservation areas identified in the Recovery Plan

BENEFITS	RESIDUAL IMPACTS
Ord-Rodman DWMA Excluded • No minimizing conditions, as described above for Pinto Mtn., were identified for excluding this DWMA	Ord-Rodman DWMA Excluded • Would not provide DWMA-level management for the one region with the highest distance sampling encounter rate observed in the entire listed range; a total of 80 mi^2 of higher density tortoise areas would not be included • Without this DWMA, there would be no proactive conservation of the main region of the South-central Mojave ecotype occurring within the planning area; cattle grazing and OHV use, in particular, would likely increase without protective measures associated with Alternative A DWMA management • No catastrophic die-offs have been observed in this region, although a smaller recent die-off has been identified just south of I-40. This DWMA is isolated from other tortoise concentration areas, having both positive and negative ramifications relative to disease, as described in Chapter 3. It would not be available to serve as a disease-free refugium should catastrophic die-offs extirpate tortoises within the one DWMA. • If catastrophic die-offs are associated with drought, tortoises in this region are less likely to be affected, as monsoonal rains characterize the area, providing climatic conditions and plant growth that are more favorable to tortoise health than in areas to the north and west
Effect on Tortoise Recovery • Satisfies recovery criterion that at least one DWMA be established and that it be at least 1,000 mi^2 in size	Effect on Tortoise Recovery • Tortoises would be substantially more susceptible to extinction from stochastic events due to the contiguity and relatively small size of the one DWMA compared to Alternative A DWMAs. Wild fires, spread of disease, localized droughts, and other "natural" impacts could eliminate tortoises with little likelihood of immigration. Eliminating the Ord-Rodman and Pinto Mtn. DWMAs would increase this likelihood, as those tortoise refugia would not be managed to minimize impacts of natural, random events • This Alternative would result in putting more tortoises in harm's way with regards to the newly expanded Fort Irwin boundaries. The northern DWMA boundary of Alternative A is 135 miles long, compared to 99 linear miles in Alternative E. Although both alternatives have common boundaries with the expanded installation, 56% of the northern boundary of Alternative E versus 41% of that of Alternative A shares a common boundary. The Alternative E DWMA, then, would share 15% more of its northern boundary with the installation than Alternative A. As such, it would be considerably more vulnerable to indirect impacts of Army training (i.e., sink effect, increased dust, noise, etc.) than Alternative A, which would constitute a significant adverse impact to the over all strategy

BENEFITS	RESIDUAL IMPACTS
Recent and Current Tortoise Occurrence **Includes**: • 1,118 mi^2 (10% of the 2002 range) within *one* DWMA • Good representation in central part of 2002 range • 299 mi^2 (53%) of higher density areas • 212 of 424 (50%) observed tortoises • 1,042 mi^2 (40%) of USFWS critical habitat • 494 mi^2 of BLM Category I (50%) and 146 mi^2 of Category II (39%) habitats	Recent and Current Tortoise Occurrence **Does not include**: • 10,016 mi^2 (90%) within the 2002 range • Poor representation to the west and in periphery of range • 263 mi^2 (47%) of higher density areas • 212 of 424 (50%) observed tortoises • 1,569 mi^2 (60%) of USFWS critical habitat • 488 mi^2 of BLM Category I (50%) and 224 mi^2 of Category II (61%) habitats • Importantly, this alternative would fail to include the 40 mi^2 DTNA, which is the only place currently expressly managed for tortoises. Available data suggest that this is one of the few places within older die-off areas where there is reproduction and recruitment, as evidenced by 8 of 13 (61%) tortoises observed there being subadults
Land Management Within DWMAs • Fencing the periphery of the one DWMA would have the same positive and negative impacts described in Alternative A and C • Recommendation to translocate tortoises from nearby impact areas into the one DWMA, and prohibition of mass translocations, are same as Alternative A	Land Management Within DWMAs • As discussed in Alternative F, it would appear that both older and newer die-off regions have affected much of the Superior-Cronese DWMA associated with Alternative A. About 2/3 of this alternative's DWMA occurs north of Highway 58, where recent die-offs have been detected. The distribution of these recent die-offs is particularly significant for the one DWMA, as most of the tortoise populations there have either been directly affected or are likely to be in the very near future
Land Management Adjacent to DWMAs • Would result in no common boundaries between the one DWMA and BLM open areas, so would distance these existing (and future) impacts from the DWMA	Land Management Adjacent to DWMAs • As a result of this alternative, the cumulative size of "adjacent" areas would be substantially enlarged, including critical habitat and existing management areas that would no longer be managed for tortoise conservation; the ramifications of this are given throughout this table
DESIGNATION AND MANAGEMENT OF ONE DWMA AS AN ACEC	
Size Relative to the Existing Tortoise ACEC • Net increase of 701 mi^2 of public lands in ACECs, which is 17 times larger than the DTNA at 40 mi^2, which even under this intense recreation scenario, would be substantially better than the current situation	Critical Habitat versus New DWMAs • As reported above, a total of 1,569 mi^2 of critical habitat would not be included in the one DWMA, which would substantially increase the management problem of how critical habitat outside DWMAs would be managed, assuming the USFWS would not eliminate critical habitat designations from non-DWMA lands • The USFWS defines critical habitat as "essential habitat." In light of older and newer die-off regions, there is no justification for making essential habitats smaller; if anything they should be larger; this is significant adverse impact for this alternative
BLM ACEC Management • ACEC management would be relatively more restrictive to human uses in the one DWMA than under Alternatives A, C, and D, as given elsewhere in this table	BLM ACEC Management

BENEFITS	RESIDUAL IMPACTS
BLM Management of Category I, II, & III Habitat • Reclassification of all public lands in the one DWMA as Category I Habitat, and remaining public lands as Category III Habitat, which would provide relatively more protection inside the DWMA	BLM Management of Category I, II, & III Habitat • Existing Category I & II habitats (710 mi^2) habitats on public land outside the DWMA would be changed to Category III, replacing relatively protective goals (maintaining and/or increasing stable, viable populations in Category I & II) with less protective ones (limit declines through mitigation in Category III)
Plan Implementation	Plan Implementation • The ITA would be 2,171mi^2, compared to 1,118 mi^2 in the one DWMA where conservation would be intended to offset the authorized take, which is a significant adverse impact
Federal Permitting • Standardized, stream-lined permitting would occur as in Alternative A, with the following exceptions: • Level 1 BMPs would apply to the 1,118 mi^2 DWMA, and Level 2 BMPs would be applied to the remaining Survey Areas, including critical habitat • The Survey Area size would not change relative to Alternative A, although presence-absence surveys would no longer be applied to 1,190 mi^2 of lands that would have been surveyed under Alternative A	Federal Permitting • Alternative would substantially detract from USFWS minimization and mitigation standards, as it would fail to mitigate impacts to the "maximum extent *practicable*," it would substantially fail to achieve recovery standards in terms of reserve design and other specified variables, it would apply Level 2 BMPs to lands outside the DWMAs (including critical habitat) that would receive Level 1 BMP protection under Alternative A, and it would result in increased uses that are known to impact tortoises and habitats in spite of the new data that show tortoises are not as common as they were believed to be in 1990 when the tortoise was listed or 1994 when the final Recovery Plan was issued
State Permitting • Same as given above for Federal Permitting	State Permitting • CDFG's fully minimize and mitigate standard would be substantially undermined for the same reasons given above for federal permitting
Compensation & Fee Structure• Compensation would be implemented as given in Alternative A, except the expanded ITA and reduced DWMA would result in substantially less compensation fees than would result in Alternative A; even so, the smaller DWMA land base would result in fewer conservation programs requiring funding	Compensation & Fee Structure

BENEFITS	RESIDUAL IMPACTS
MULTIPLE USE FROM CLASS M AND UNCLASSIFIED PUBLIC LANDS TO CLASS L IN ONE DWMA	
Size and Distribution within One DWMA • Would result in the reclassification of 373 mi^2 of Class M (284 mi^2) and unclassified public lands (89 mi^2) to Class L in the one DWMA • Changing BLM Class M and unclassified public lands to Class L status in the one DWMA would resolve impacts associated with Class M and unclassified lands, and provide for beneficial effects of Class L management (see Alternative A) • This change would mostly affect those portions of the one DWMA that correspond to the Superior-Cronese DWMA of Alternative A, where 244 mi^2 of Class M would be reclassified as Class L	Size and Distribution within One DWMA • See discussion in Alternative A • There is a general concept that smaller areas would be substantially more affected by external influences (i.e., both direct and indirect effects) than larger areas. If, for example, the indirect impacts affect an area of one linear mile inside a given boundary, substantially more of the 1,000-acre DWMA would be compromised than in the 2,400-acre DWMA of Alternative A.
• 117 mi^2 (21%) of higher tortoise densities would be managed as Class L	• 85 mi^2 (15%) of higher tortoise densities would be managed as Class M • 25 mi^2 (4%) of higher tortoise densities would be managed as Class U
1% ALLOWABLE GROUND DISTURBANCE	
Function to Minimize Impacts • Benefits of minimizing impacts to 1% of the DWMA land base would be proportionate to its size and location; in this alternative 1% of the DWMA corresponds to 7,156 acres (11 mi^2), which would still have the benefits given in Alternative A, but to a somewhat less degree	Function to Minimize Impacts • Impacts given in Alternative A would still apply, but would be relatively more significant given the smaller DWMA size. All 661mi^2 of private lands in Kern County, for example, would be available development as opposed to 315 acres (0.5 mi^2) corresponding to 1% of Alternative A DWMAs that would not be included • 1% AGD was a concept based on substantially larger DWMAs and substantially smaller ITAs; its application to this alternative with a substantially smaller DWMA and substantially larger ITA would undermine the effectiveness of the concept. This would argue for at least a 2% AGD to be relative to the smaller DWMA, which is about twice as small as the alternative for which the concept was originally determined. Failure of the alternative to identify a concomitantly larger AGD may result in significant adverse impacts

BENEFITS	RESIDUAL IMPACTS
PRIVATE LAND ACQUISITION AND PUBLIC LAND DISPOSAL	
Acquisition Priorities • Under this alternative, a total of 398 mi^2 of private lands would occur in the smaller DWMA, which would cost $127,385,500 based on the assumption of $500/acre land costs; although still expensive, this compares to $212,480,000 to purchase all private lands in Alternatives C and D. Although it would cost about $214,083,500 to acquire private lands in Alternative A DWMAs, Alternative A could function without the need to purchase all private lands	Acquisition Priorities • Would fail to acquire private lands outside the one DWMA (i.e., particularly in the Ord-Rodman DWMA and south of Edwards Air Force Base) in higher density tortoise areas
BLM Management • Prioritizing acquisition within the DWMA while ensuring no net loss of private land acreage from the planning area would have similar advantages as given in Alternative A in terms of facilitating BLM DWMA management	BLM Management
BLM Land Tenure Adjustment (LTA)	BLM Land Tenure Adjustment (LTA) • If new land tenure adjustment would result in the disposal of public lands located outside of the one DWMA, both tortoises and habitats would be significantly impacted, depending on the amount and location of disposed lands
NEW AGRICULTURAL DEVELOPMENT	
• Given that all public lands within the one DWMA would be changed to Class L, no new agriculture (including biosolids fields) would be allowed, which is relatively more protective than Alternative A, where agriculture would be allowed on 754 mi^2 of Class M lands and 166 mi^2 of Class U in those DWMAs	• As with Alternative A, agricultural development would still be allowed (though not authorized) on private lands in the one DWMA
COMMERCIAL FILMING ACTIVITIES	
• Commercial filming would be prohibited in the one DWMA, and the proactive program of Alternative A would be applied to all tortoise habitats outside the DWMA	

BENEFITS	RESIDUAL IMPACTS
CONSTRUCTION ACTIVITIES	
• Fee compensation program, 1% AGD, clearance surveys in designated Survey Areas (including all DWMAs), implementation of BMPs, and other programs would result in significant beneficial impacts within the DWMA	• Programs implicated in left column would either not function or the benefits would be substantially diminished outside the one DWMA
DISEASE MANAGEMENT	
• The most effective disease management program would be applied to regions of higher density tortoise occurrence, which would still occur in the one DWMA • The "Disease Management Trust Fund" would be provided, with the same advantages and disadvantages given in Alternative A	• Disease management would not likely occur outside the DWMA, so that any advantages would not be applied to those higher density tortoise areas (i.e., particularly in the excluded Ord-Rodman DWMA and south of Edwards Air Force Base)
DROUGHT	
Motorized Vehicle Access • There are a total of 2,059 linear miles of digitized, existing routes in the one DWMA, 801 linear miles of which (39%) would be closed • As in Alternative A, the prevalence of roads in washes that are designated as open would determine, in part, the effectiveness of minimizing impacts most likely to occur during drought. In this alternative, 83 linear miles (63%) of 131 linear miles indicated as wash routes would be closed, compared to 48 linear miles (37%) left open in washes	Motorized Vehicle Access • The relatively small percentage of route closures would result in a significant adverse impact to tortoise conservation in the one DWMA. The one DWMA is supposed to be managed somewhat more protectively than Alternative A DWMAs, for example. However, one sees that only 39% of the existing routes are closed in this relatively small area, compared to a 44% reduction in the alternatives under which larger DWMAs would be established. In addition to the relatively small reduction, the alternative would allow for increased recreational impacts in many other tortoise habitats outside the DWMA, which exacerbates the impact.
FERAL DOG MANAGEMENT	
• As in Alternative A, a Feral Dog Management Plan would be developed, and its application would be somewhat facilitated by the smaller DWMA size	• Would fail to address and protect tortoises in non-DWMA areas, which would most likely affect higher density tortoise areas in the excluded Ord-Rodman DWMA and south of Edwards Air Force Base
FIRE MANAGEMENT	
• Enhanced fire fighting management program of Alternative D would be applied to the one DWMA	• As given above, the relatively small size of the one DWMA makes it more vulnerable to both the effects of fire and the relative impacts of fire fighting activities
CATTLE GRAZING ON BLM ALLOTMENTS	
Voluntary Relinquishment • Same as Alternative A	Voluntary Relinquishment • Same as Alternative A

BENEFITS	RESIDUAL IMPACTS
No Exclusion Areas Designated • Removing grazing authorization from the Harper Lake and Cronese Lakes allotments would be more effective than implementing the exclusion area concept of Alternative A; would better serve to protect tortoises in the southern part of Harper and eastern part of Cronese Lakes, which in Alternative A correspond to cattle concentration areas that are outside exclusion areas	No Exclusion Areas Designated • No exclusion areas would be designated for the Ord Mountain Allotment, so that seasonal restrictions and utilization levels given in Alternative A would not apply; this would perpetuate current impacts and likely result in competition between cattle and tortoises, but not any more so than Alternative A, as the Exclusion Area concept would also fail to avoid impacts; significant impacts would likely result
Cattle Management on Ord Mountain Allotment	Cattle Management on Ord Mountain Allotment • Since the Ord-Rodman DWMA would not be designated, the following prescriptions would not be implemented, the benefits given in Alternative A would not apply, and the impacts would persist: • New range fences would not be installed, so current cattle trespass would continue to impact tortoise concentration areas north and south of the allotment •Ephemeral allocations and temporary non-renewable grazing permits could continue to be authorized in all areas, which would allow additional cattle to be put on the allotment during years of favorable annual plant production, which may lead to relatively more impacts to tortoises, concomitant with elevated cattle use • There would be no requirement to remove carcasses within two days, so that discretionary removal may lead to providing an otherwise unavailable food source to tortoise predators • There would be no new requirement or timeline for completion of health assessments, which would result in failure to identify and remedy non-compliance issues in a timely manner, or to identify places where remedial actions are required to achieve health standards
SHEEP GRAZING ON BLM ALLOTMENTS	
No Sheep Grazing in DWMAs • Most of the allotments encompassed by the one DWMA were effectively retired from grazing with the issuance of the USFWS BO, so prohibition of sheep from the DWMA would have no new beneficial impact; removal of those allotments from the CDCA Plan would result in no likelihood of grazing in next 30 years	No Sheep Grazing in DWMAs • Sheep grazing would continue to occur on the 14 mi^2 of the Shadow Mountain Allotment • Would result in continued sheep grazing on 1,733 acres (3.0 mi^2) of critical habitat on the Shadow Mountain Allotment
Utilization Levels and Combined Bands • The utilization of 230 pounds ephemeral dry weight per acre and minimizing sheep bands to 1,600 head, would not be implemented, but were similar enough to current management that beneficial impacts are likely to be minimal	Utilization Levels and Combined Bands • Under the prescription, current management would prevail and be applied to the allotments given above
GUZZLERS	
• All guzzlers within the one DWMA would be assessed and problems remedied, as for Alt A	• Same as Alternative A
HABITAT CREDIT COMPONENT	

BENEFITS	RESIDUAL IMPACTS
Applications and Success Criteria • As in Alternative A.	Applications and Success Criteria • Same as Alternative A, but somewhat more adverse given the smaller sized DWMA
HEAD STARTING PROGRAM	
• Implementing the head starting program of Alternative A inside the one DWMA and collecting gravid females from adjacent areas would be most efficacious in the northern and northwestern portions of the DWMA where populations levels are low; otherwise the same as Alternative A	• Would fail to repopulate areas northwest of the one DWMA that were shown to support significantly higher numbers of tortoises as recently as the 1970's • Given the reliance of the smaller area to ensure conservation and and promote recovery, alternative would be less to succeed than a program implemented in multiple areas
LAW ENFORCEMENT	
• The proposal to employ two new law enforcement rangers and two new technicians to enforce regulations in the one DWMA is consistent with Alternative A (i.e., both alternative call for a total of four new personnel per DWMA), so a similar level of new enforcement personnel would be employed, and beneficial impacts of Alternative A apply	• Same as Alternative A
MOTORIZED VEHICLE ACCESS NETWORK	
Overall Importance • Designating and implementing a motorized vehicle access network that is supported by land use laws and compatible with tortoise recovery would be substantially more important if this alternative is to function to minimize and mitigate impacts authorized in a substantially larger ITA	Overall Importance
Route Reductions in Specified Regions • In the one *DWMA*, the network would result in the closure of 801 linear miles (out of 2,059 linear miles) of routes, which is a 39% reduction. This would have both immediate and long-term benefits • Within *higher density areas*, the network would result in the closure of 313 linear miles of routes (out of 727 linear miles), which is a 43% reduction of routes in this area. This would have immediate and long-term benefits where tortoises are most abundant • Within *lower density areas*, the network would result in the overall reduction of 488 linear miles of routes (out of 1,332 linear miles), which is a 37% reduction of routes in this area. This would have immediate benefits to habitat and long-term benefits to overall conservation • Within *above-average vehicle disturbance areas*, there are 353 linear miles of existing routes, 156 linear miles (44%) of which would be closed.	Route Reductions in Specified Regions • Use of the remaining 1,258 linear miles of open routes in the *DWMA*, representing 61% of existing routes, would continue to result in permitted and un-permitted impacts. This would constitute a significant adverse impact, as the one DWMA is supposed to be managed somewhat more proactively for tortoise conservation to offset authorized development impacts and increased recreational opportunities. • The remaining 414 linear miles of open routes (57% in area) in *higher density areas* would continue to result in impacts, and put tortoises in harm's way in the places where they are most likely to be adversely affected • The remaining 844 linear miles of open routes (63%) in *lower density areas* would continue to result in impacts to the few remaining animals, which are critical for re-establishing reduced or extirpated populations • The remaining 197 linear miles within *above-average vehicle disturbance areas* (56%) would remain open and continue to put tortoises in harm's way where traditional vehicle impacts are shown to be most prevalent

BENEFITS	RESIDUAL IMPACTS
RAVEN MANAGEMENT	
Application • All measures in Alternative A would be pursued and implemented	Application • Contingency corridors running through the Ord Mountain area would not be considered in the context given in Alternative A • Barstow landfill would continue to subsidize predators and adversely affect higher density areas located in the immediate vicinity
RECREATION ACTIVITIES	
Expansion of Spangler Hills Open Area • Expansion of the Spangler Hills open area to the south onto 24 mi^2 would result in new, focused vehicle impacts in an area of relatively low tortoise concentration, including 11 mi^2 of non-critical habitat, and 7 mi^2 of habitats that are already degraded by vehicle impacts	Expansion of Spangler Hills Open Area • Expansion would result in increased cross-country travel, visitor use, and other impacts that would adversely affect resident tortoises. Although no higher density tortoise areas would be directly affected, the expansion would result in increased impacts to 13 mi^2 of critical habitat and 16 mi^2 of current Category I Habitat
Competitive "C" Routes in Spangler Hills	Competitive "C" Routes in Spangler Hills • "C" Routes are associated with the Spangler Hills Open Area, were used for competitive events originating and ending in the open area but extending into adjacent areas, and became no longer available as a result of the recent settlement between the BLM and Center for Biological Diversity. Reopening these routes will result in impacts both inside and outside the open area
Expansion of Johnson Valley Open Area	Expansion of Johnson Valley Open Area • Expanding the Johnson Valley Open Area into 23 mi^2 of the Cinnamon Hills would constitute a significant adverse impact to the concentration of tortoises in the northern part of Lucerne Valley. Of the 24 mi^2 of higher density tortoise areas, the expansion would directly impact 20 mi^2, or 83% of that area, and overtime could extirpate tortoises from the northern Lucerne Valley • Expansion would result in 18 mi^2 of critical habitat being affected by Class I management, which would place recreational use as a higher priority than tortoise conservation • Protections provided by DWMA management would not be in place, uses would be less regulated, and concomitantly more prevalent and significant. Adjacent public lands to the west would continue to be managed as Category II Habitat and Class L, which would minimize impacts of new development but have no effect in minimizing direct and indirect OHV impacts • Local extirpations would be expected, and direct impacts to adjacent populations would likely increase, seriously compromising a subpopulation that is already threatened by its proximity to the existing open area and the urbanization of Lucerne Valley, which would constitute a significant adverse impact

BENEFITS	RESIDUAL IMPACTS
Creation of New Fremont Recreation Area • 53 mi^2 of Class L lands would be converted to Class M, which would result in relatively more impacts, but not as severe as would occur if the area was newly designated as Class I (the status of official BLM open areas) • Although establishing the new recreation area would constitute a significant impact (see right column), impacts would be relatively less significant than if the area were being designated as an Open Area	Creation of New Fremont Recreation Area • Creating the new Fremont Recreation Area on 53 mi^2, all of which is critical habitat, would constitute a significant adverse impact, more so to essential habitat than to resident tortoises, which are largely extirpated from the region; although no higher density tortoise areas would be affected, there are also no higher density human use areas (excepting areas around the south part of Cuddeback Lake, east of Fremont Peak), so much of the habitat is relatively undegraded • The new recreation area designation would result in concentrated and elevated vehicle use that would not be compatible with tortoise recovery, and would result in degradation of critical habitat • Severity of impacts would be dependent on authorized and restricted uses given in the recreation area management plan to be prepared for the area. If the management plan allows for off-road travel adjacent to the route instead of restricting vehicles to the racecourse route, for example, the impacts would be relatively more severe. In either case, the new recreation area would receive more vehicle use and result in more cross-country travel, litter and garbage (with a likely increase of ravens), camping, and other activities that would adversely affect tortoises and habitat • Relatively more approved routes would have a concomitant level of impact to tortoises and habitat than if fewer routes were designated as open
Competitive Speed Events • Those competitive events that employ a "staggered start" would have relatively less impacts than under the "mass start" scenario described to the right, so that most impacts adjacent to the racecourse would result from passing, using or creating paths adjacent to the racecourse, or loss of control	Competitive Speed Events • Competitive motorcycle events would be allowed and subject to Class M guidelines, which would allow for relatively more impacts than Class L and relatively less than Class I; impacts would also be more prevalent on unclassified lands • Unlike dual sports, which are restricted to approved routes of travel, competitive motorcycle events are not restricted to roads and would result in substantially more impacts to tortoises and particularly habitats • In those events that employ "mass starts" (e.g., European and Hare Scrambles, Hare and Hound Scrambles, Grand Prix, etc.), cyclists are spread out at the start, race cross- country for a short distance, then enter the racecourse route, and more or less remain on the road thereafter, except for passing and use of parallel routes; off-road travel adjacent to the course is not prohibited, so route widening and proliferation would likely occur

BENEFITS	RESIDUAL IMPACTS
Management of Enduros and Dual Sports • Although competitive in nature, impacts of enduros are more like those of dual sports (minimal) than like competitive events (maximum) • Prohibiting competitive events (excepting enduros) from the one DWMA would constitute a beneficial impact that would effectively avoid loss of tortoises and degradation of habitat • Allowing organized vehicle events (including dual sports) in the one DWMA would not constitute a significant impact, so long as regulated by the biological opinion for that use	Management of Enduros and Dual Sports • The enduro course that would run from El Mirage to Spangler Hills would pass through 18 linear miles of the one DWMA, and 8 linear miles through higher density areas, which may adversely affect tortoises depending on event timing and other considerations (i.e., locations of pitting, stopping, and starting points) • The alternative does not identify a timeframe for conducting enduros, which may have significantly more impacts to tortoises than dual sports, which are restricted to the winter inactivity period of most adult tortoises. Like dual sports, there would still be some potential impact to tortoises (particularly juveniles), which may be active in the late fall and winter • Although participants in enduros and dual sports would remain on the designated route, adverse impacts would occur in pitting, staging, and starting areas; any such concentrated use areas occurring in the one DWMA would constitute a significant adverse impact
Competitive Events North of El Mirage Open Area	Management of Competitive Events • Competitive vehicle events between Shadow Mountain Road and the El Mirage Open area would occur in a 9 mi^2 area. This area does not include any higher density tortoise areas, but is critical habitat and managed as Class L • Authorization of motorcycle events in the area would occur north of the open area fence line, which was intended to restrict all vehicle impacts to the open area, and result in impacts to tortoises and habitats where they are not intended to occur
Competitive Event Corridors	Competitive Event Corridors • Competitive events would be authorized in both the Stoddard-to-Johnson Valley and Johnson Valley-to-Parker corridors in the absence of yellow flag conditions, because the single DWMA would not be crossed; although the Stoddard-to-Johnson corridor would be reconfigured to avoid higher density areas in northern Lucerne Valley, it would bisect the higher concentration area to the north, adjacent to Highway 247; significant adverse impacts are likely to occur in the absence of protective stipulations
Other Conservation Measures • There would be substantial cost savings associated with dropping the following programs because the one DWMA would not share any common boundaries with open areas: • No need to sign those portions of Stoddard Valley, Johnson Valley, and El Mirage open areas as there would be no adjacent DWMAs • No need to fence the boundary between the Johnson Valley Open Area and the excluded Ord-Rodman • Camping, stopping, and parking restrictions in the DWMA would be the same as those identified in Alternative D, having the same beneficial impacts	Other Conservation Measures • Higher density areas in northern Lucerne Valley and north of El Mirage would continue to be adversely affected by dropping the programs given to the left • Camping, stopping, and parking restrictions would not be changed from current management in areas outside the DWMA, which would perpetuate current impacts, and particularly affect higher density areas in the Ord Mountains and south of Edwards Air Force Base

BENEFITS	RESIDUAL IMPACTS
Gunshot Impacts • As in Alternative D, no shooting or hunting would be allowed anywhere within the one DWMA, which would serve to protect tortoises in a majority of the areas where they are most likely to be encountered	Gunshot Impacts • In the absence of increased law enforcement, reduced route density, and other protective programs, gunshot mortalities would continue, unabated, to affect higher density areas, which are mostly in the excluded Ord-Rodman area and south of Edwards Air Force Base
TRANSPORTATION	
Highway and Road Fencing • Maintaining fencing priorities and ensuring that OHV recreation access would not be substantially impaired would be the same as Alternative A, since all alternatives where fencing would be installed would require coordination among the BLM and affected publics to ensure that portals across paved roads, open area boundary fencing, etc. would provide for adequate access • Highway 395 would still be fenced along 28 linear miles between the southern boundary of the one DWMA and just north of Kramer Junction	Highway and Road Fencing • Same as described in Alternative A and elsewhere • Highway 395 would not be fenced along 27 linear miles occurring north of the one DWMA boundary, which would perpetuate loss of tortoises along the stretch of road, but not as many as would likely occur to the south where fencing would be installed
UTILITIES	
Utility Corridors and New Construction • Management affecting utility corridors would be the same as Alternative A, except within the Ord Mountain area	Utility Corridors and New Construction • Same as given in Alternative A and elsewhere • Depending on the location and configuration, new wind power facilities would not be restricted to utility corridors and would have relatively more adverse impacts in the one DWMA • Specific guidelines for corridors in the Ord Mountain area would not apply, providing for less protection

This alternative is predicated on the assumption that intensive management in a smaller DWMA would ensure tortoise conservation and promote recovery while simultaneously allowing for increased recreational opportunities outside the DWMA. The DWMA configuration would encompass all higher density tortoise areas in the Fremont-Kramer and Superior-Cronese DWMAs of Alternative A, with the exception of 47 mi^2 south of Edwards Air Force Base and west of Highway 395. It would fail to encompass 80 mi^2 of similar habitat in the Ord-Rodman DWMA, and would not provide proactive tortoise conservation for animals in the Pinto Mountain DWMA, where densities appear to be lower, not recently subject to catastrophic die-offs, and possibly relatively disease-free, based on available data.

Compared to Alternative A, the 1,863 mi^2 Incidental Take Area would be substantially expanded and the 2,693 mi^2 DWMA would be substantially reduced, which would seriously undermine the likelihood of achieving minimization and mitigation standards required by the USFWS and CDFG. The single DWMA would be substantially more vulnerable to extinction from stochastic events, and far more susceptible to epidemic spread of disease. Ironically, culverts left open beneath Highway 58 to avoid fragmenting regional tortoise populations may have allowed diseased tortoises to move from north of the highway to the south. Therefore the

higher concentration areas within the one DWMA may already be susceptible to die-offs in the near future, which would seriously compromise the conservation value of this alternative.

Prevailing theories for region-wide, catastrophic die-offs suggest that disease, drought, or a combination of the two are responsible, and that tortoises die in a one or two-year period, as evidenced by the similar time since death for observed carcasses. It would appear that older and newer die-off regions have already significantly affected tortoises in the northern portions of the Fremont-Kramer and Superior-Cronese DWMAs, respectively (see discussion following Alternative F). Whether diseased or enduring prolonged drought, both conditions result in physiological stresses that leave tortoises in a weakened, malnourished, water-imbalanced condition. One hypothesis is that URTD in wild tortoises resulted from contact with ill captive animals released into the desert (i.e., pathogen recently introduced to wild populations). The other hypothesis is that the mycoplasma organism responsible for URTD has always been present in the population (i.e., pathogen a "natural" part of the population, not recently introduced), but does not express itself in mortality until tortoises are faced with other environmental stressors, such as drought.

In either case, many proponents of both theories believe that additional, human-related stressors are sufficient to kill tortoises that are already in a weakened state. Some of these human stressors have occurred for a 100 years (i.e., livestock grazing) and have already resulted in degraded habitats of lower nutritional quality (i.e., more non-native plants of lesser nutritional quality), inferior burrowing potential (i.e., physical removal of shrubs, which are preferred by tortoises for burrowing, by cattle and particularly sheep), and other suboptimal habitat conditions. Other human stressors are relatively recent, having been newly introduced over the past 20 to 30 years (e.g., urbanization, ground-based military maneuvers, OHV use, highways and freeways), and have resulted in habitat loss and degradation, poor air quality, and extensive habitat fragmentation. Tortoises that may (or may not) have harbored the URTD pathogen have been subjected to drought cycles over the past several thousand years. Historically, they were able to tolerate these stressors, but are unable to do so now because of poor habitat quality associated with human uses and impacts.

Regardless of these suspected (and unexpected) factors, catastrophic die-offs have occurred and will continue to occur, regardless of the conservation strategy that is ultimately implemented. The one DWMA alternative is more susceptible to failure because it would relegate conservation to a single (albeit large) conservation area, and would promote recreational and grazing uses that result in habitat degradation and tortoise mortality over much of the remaining area. It also fails to incorporate principles of reserve design that call for multiple conservation areas. The alternative would have been substantially more effective had the Ord-Rodman and Pinto Mountain areas been established and managed as "contingency DWMAs," to counteract the foreseeable possibility that the one DWMA population may crash. These relatively small areas of critical habitat are isolated from the one DWMA, and would not be susceptible to spread of epidemic disease(s) from the one DWMA. If drought is responsible for the die-offs, excluding the Ord-Rodman DWMA would be a fatal flaw to the successful function

of the alternative, as the Ord Mountain area receives summer rainfall that is uncharacteristic in the one DWMA, and would serve as a drought-tolerant, tortoise refugium.

The alternative is predicated on the assumption that protecting tortoises where they presently occur in relative abundance would be sufficient to ensure species conservation, promote recovery, effectively minimize and mitigate authorized take, and prevent regional extinction. The alternative would fail to achieve this objective for the following reasons:

- All alternatives are vulnerable to catastrophic die-offs, but this alternative is particularly susceptible for the reasons given above. Failure of the alternative to proactively protect the isolated, physically separated populations in the Ord-Rodman and Pinto Mountain DWMAs, is a fatal flaw.

- Even the best available data have inherent temporal weaknesses, meaning that they represent a "snap shot in time," which reveals nothing about previous population levels or current population trends. What are herein defined as "above-average" and "higher density" tortoise areas are based on a data set that was collected between 1998 and 2002. Dr. Berry's studies from the 1970's through early 2000's reveal that tortoise populations, once estimated to occur in excess of 200 tortoises/square mile, have crashed and residual populations currently support fewer than 50 tortoises/square mile. It is possible that higher density areas identified herein constitute a small fraction of previous population densities; that the current "snap shot" is of a population that is in steady decline; and that limiting proactive management to one DWMA would not function to conserve or recover tortoises.

- Although head starting is proposed under this alternative in a limited manner, and has the inherent weaknesses described in Chapter 3, it would have been applied most effectively to regions that were known to previously support significant tortoise populations, that have experienced significant declines, yet that possess habitat that still appears to be intact and suitable. Given the best available scientific information, lands located northwest of the one DWMA (see Alternative A DWMA boundary for comparison) are the best candidates for repatriation and recovery (i.e., implies re-gaining or re-establishing previous populations). Under this alternative, DWMA management proposed in Alternative A would be replaced with increased recreational opportunities (i.e., expansion of Spangler Hills Open Area, creation of new Fremont Recreation Area, perpetuation of unabated vehicle impacts in the Rand Mountains, etc.) and continued sheep grazing (i.e., Cantil and Cantil-Monolith allotments) in the very areas where tortoise recovery would have been most beneficial.

4.6.2.3 Mohave Ground Squirrel

Alternative E is founded on the assumption that MGS conservation would function within the context of the MGS CA and a single DWMA, the latter of which was designed to protect higher desert tortoise concentration areas. The alternative would allow for enhanced ecosystem protection within the one DWMA and enhanced recreational opportunities outside that DWMA; except for the differences identified, conservation within the MGS CA where it does not overlap with the one DWMA would be similar to the MGS Alternative A proposal.

Similar impacts given for the tortoise and/or MGS (mostly in Alternative A for the two species) would affect the following programs where the two species ranges coincide: Los Angeles County Significant Ecological Area; Sierra Foothills Habitat Connector; Species-specific Conservation Areas; Incidental Take Authorization; Compensation and Fee Structure; 1 % Allowable Ground Disturbance; Best Management Practices; HMP Instead of ACEC Designation; Conservation Relative to Military Bases; Dump Removal and Waste Management; Education; Feral Dog Management Plan; Habitat Credit Component; Habitat Reclamation and Restoration; Mining; Raven Management Plan; Utilities Construction and Maintenance; Motorized Vehicle Access; Non-competitive Events (Dual Sports); Hunting and Shooting; Surveys (Presence-Absence Surveys, Exploratory Surveys, Surveys for Other Species); Transportation (Highway Fencing and Culverts, Road Maintenance); and Monitoring.

Table 4-60 reports only those benefits and residual impacts as they relate to MGS conservation that are different from the impacts identified under previous alternatives for the MGS and tortoise. As such, the programs listed above are not reiterated in the table.

Table 4-60
Mohave Ground Squirrel Impacts of Alternative E

BENEFITS	RESIDUAL IMPACTS
Conservation Area Size of Conservation and Incidental Take Areas • (AE-1) Establishing the single DWMA of 1,118 mi^2 would include 823 mi^2 within the MGS range (11% of the 7,691 mi^2 range). • (AE-1) The alternative would also include 1,870 mi^2 of the MGS CA in Alternative A that is west and north of the one DWMA. The total MGS CA, inclusive of the 823 mi^2 in the one DWMA, would be 2,693 mi^2 (same as Alternative A).	Conservation Area Size of Conservation and Incidental Take Areas • (AE-1) It would exclude 19 mi^2 south of Shadow Mountain Road, which is also within the range.
Management Structure within the MGS CA DWMA Management within the MGS CA • Conservation areas for the Mohave ground squirrel and other species would be established as proposed for Alternative A and has similar benefits.	Management Structure within the MGS CA DWMA Management within the MGS CA

BENEFITS	RESIDUAL IMPACTS
Management Structure within the MGS CA Multiple Use Class Designations • (AE-2) Reclassifying all BLM multiple use class M lands within the DWMA to class L would have the same conservation values as described above, particularly with regards to new agriculture, new construction, and recreation. • Prohibition of competitive and organized off highway vehicle events, commercial filming, and shooting/hunting would all result in fewer impacts than would otherwise occur without the prohibitions, although may not be necessary for dual sports and hunting/shooting, which represent lesser threats to MGS conservation than the other uses. Category I, II, & III and Critical Habitats for Tortoises • (AE-11) The reclassification of all public lands within the single DWMA to Category I would be intended for tortoise protection, but would also benefit the MGS and habitats.	Management Structure within the MGS CA Multiple Use Class Designations Category I, II, & III and Critical Habitats for Tortoises • (AE-11) The reclassification would result in all lands within the MGS CA outside the DWMA being designated as Category III, which would have less conservation value and may promote adverse impacts to the MGS and habitat.
Miscellaneous Conservation Programs Commercial Filming and Plant Harvest	Miscellaneous Conservation Programs Commercial Filming and Plant Harvest • (AE-13) Allowing commercial filming outside the DWMA, including the MGS CA, could result in ground disturbance and habitat degradation that could adversely affect the MGS and habitats.
Miscellaneous Conservation Programs Fire Management • (AE-17) Implementing the fire management program described for Alternative D would have the same positive effects as given in that table above.	Miscellaneous Conservation Programs Fire Management
Miscellaneous Conservation Programs Land Acquisition • (AE-15) Applying acquisition priorities within the DWMA would serve to consolidate public lands and constitute a beneficial impact, but would not be directed toward habitats within the MGS CA. This would be a negligible impact within the MGS CA, as 2,016 mi^2 of it (75% of the MGS CA) is already managed by the BLM.	Miscellaneous Conservation Programs Land Acquisition
Miscellaneous Conservation Programs Law Enforcement • (AE-21) Assigning a minimum of 2 new law enforcement and 2 new maintenance workers to the DWMA would minimize the amount of illegal activity, particularly cross-country travel, with associated benefits.	Miscellaneous Conservation Programs Law Enforcement

BENEFITS	RESIDUAL IMPACTS
Miscellaneous Conservation Programs Signing and Fencing DWMAs • (AE-16) Stated fencing priorities would have minimal benefit to MGS conservation, as described above.	Miscellaneous Conservation Programs Signing and Fencing DWMAs
Livestock Grazing • (AE-22) Modified grazing practices would have the same beneficial impacts described for MGS Alternative A. Prohibiting cattle grazing from the Harper Lake Allotment would minimize grazing impacts on the allotment, which is fully within the range. • (AE-23) Eliminating sheep grazing from 14 mi^2 of public lands between Shadow Mountain Road and the northern, fenced boundary of the El Mirage Open Area would benefit MGS conservation.	Livestock Grazing
Recreation Competitive Events • (AE-7) Allowing enduros between the El Mirage and Spangler Hills open areas would be fully within the range, but vehicles would mostly remain on roads, so resulting habitat degradation would be minimal. • (AE-10) Requiring "yellow flag" restrictions for competitive events within the single DWMA would predictably minimize impacts along the route.	Recreation Competitive Events • (AE-9) Allowing competitive motorized recreation events (not including enduros) between Shadow Mountain Road and the El Mirage Open Area would result in habitat degradation and crushed animals. • (AE-10) Pitting, starting, finishing, and camping areas associated with the competitive events would result in habitat degradation (likely) and potential to crush animals (less likely).
Recreation Existing Open Areas and New Recreational Areas • (AE-6) Although establishing the Fremont Recreation Area would constitute a significant adverse impact (see right), the impacts would be concomitantly more severe if the recreation area were being designated as an open area.	Recreation Existing Open Areas and New Recreational Areas • (AE-6) The newly established Fremont Recreation Area would occur fully within the MGS range and promote cross-country travel and OHV impacts over 53 mi^2 and adjacent areas. • (AE-6) Changing class L to class M, allowing for competitive events, increased camping, and emphasizing vehicle access by allowing for a denser network of trails, etc. would all promote uses that result in habitat degradation (likely) and loss of animals (less likely).
Recreation Stopping, Parking, and Camping • (AE-14) Restrictions relative to stopping, parking, and camping within the one DWMA would cumulatively result in fewer impacts and less habitat degradation.	Recreation Stopping, Parking, and Camping

The balance of advantages and disadvantages would be similar to Alternative A. More protective management of the lands where the single DWMA and the MGS CA overlap would be offset by the additional motorized recreation and access allowed in the lands between the single DWMA and Highway 395, especially within the Fremont Recreation Area and lands where Class L designations were replaced by Class M. As with Alternative D, Alternative E would also result in the reclassification of about 580 mi^2 of multiple use classes to class L, which has relatively more protection than other classes (excepting Class C, which is managed as wilderness).

4.6.2.4 Bats

Impacts from Alternative E would be as described for Alternative A.

4.6.2.5 Other Mammals

Impacts on bighorn sheep, the Mojave River vole and the yellow-eared pocket mouse would be as described for Alternative A.

4.6.2.6 Birds

Burrowing owls would be vulnerable to a potential for increased impacts from recreation in the expanded Open Areas, the Fremont Recreation Area, along the enduro corridor, and along the Barstow to Vegas racecourse alignment. The magnitude of these impacts is unknown. LeConte's thrashers would experience increased disturbance to occupied habitat in these same areas. Two golden eagle nest sites are known within the Johnson Valley expansion. These could be adversely affected by increased recreation.

Impacts on all other birds would be as described for Alternative A.

4.6.2.7 Reptiles

Impacts on unlisted reptiles would be as described for Alternative A.

4.6.2.8 Plants

Impacts would be as described for Alternative A for the all covered plants species except those discussed below.

Barstow Woolly Sunflower: The proposed enduro corridor would pass through the center of the Barstow woolly sunflower conservation area. Location of the corridor here would increase the risk of damage to plants, in the event riders strayed from the route.

Desert Cymopterus: A known population of the desert cymopterus is located to the northeast of Cuddeback Lake. This overlaps the proposed Fremont Recreation Area. A much higher risk of damage to these plants would be present from inadvertent straying off designated routes.

Little San Bernardino Mountains Gilia: Without a proactive approach to protection of the limited desert wash habitat with the provision of a Special Review Area, gilia populations would be expected to decline over the long term, perhaps to the point where the plant would become listed as threatened or endangered.

4.6.3 Socio-Economics

4.6.3.1 Livestock Grazing

Impacts on cattle grazing would be as described for Alternative A, except that the Harper Lake Allotment would no longer be available for any future cattle grazing. The vast majority of the allotment would be within the single DWMA, leaving the remaining portion of the allotment non-viable due to the very limited acreage remaining and the lack of developed water. If the grazing lessee were to leave the livestock business as a result, there would be a permanent loss of 600 AUMs.

About two-thirds (2/3) of the Cronese Lake Allotment would no longer be available for any future cattle grazing. Current grazing use patterns indicate that most of the cattle grazing activity occurs on the third of the allotment lies outside the proposed DWMA. However, the flexibility to use the two-thirds of the allotment that is within the DWMA when forage and water conditions were favorable to grazing would be eliminated. This lack of flexibility may result in reductions in permitted use, or changes in the seasons of use in to maintain the current achievement of rangeland health standards.

Most impacts on sheep grazing would be as described for Alternative G (No Action). Health assessments, however, would be required within four years of plan adoption, as for Alternative A. This provision would delay BLM ability to determine if regional public land health standards are being achieved or not achieved. On public lands administered by the BLM's Barstow Field Office, all the existing sheep operations occur on allotments within OHV Open Areas. If a determination is made that a standard is not being achieved, the determination must also decide if ephemeral sheep grazing is the primary cause.

4.6.3.2 Mineral Development

Overall, the impacts on mining are similar to Alternative A. In this alternative the single DWMA would contain 640,000 acres (1,000 square miles) compared with Alternative A with 1.4 million acres of DWMA. Some of those areas, however, such as the Shadow Mountains (northwest of Adelanto), are in the MGS Conservation Area so the compensation would still apply. Although the DWMA would not cover the Newberry and Rodman Mountains area, much of this area is wilderness, so mining is already impacted in those areas. Although the DWMA would not include the Rand Mountain-Fremont Valley area, mineral related surface disturbance would be prohibited in most of the area, similar to Alternative A because any proposed operation with valid existing rights in the withdrawal would be acquired, and the minerals would be unavailable. Even without the withdrawal, this area would be an MGS HCA requiring 5:1 compensation. Most of the Ord Mountain area would be outside of an HCA so 1:1 compensation would apply. This factor, coupled with fewer restrictions on access in selected areas, makes Alternative E slightly less costly and advantageous to mineral development relative to Alternative A.

4.6.3.3 Regional Recreation Opportunities

Alternative E shares many of the same impacts on the motorized route network as Alternative A. Alternative E does have a number of unique management prescriptions that cause it to differ from Alternative A. Some of these management prescriptions will affect the designated open motorized route network and various recreational and commercial opportunities that are dependent upon motorized access.

Competitive "C" routes would be re-established in the Spangler Hills. This would expand opportunities for those forms of competitive motorcycle recreation afforded by these routes. A Fremont Recreation Area would also be established. The net impact on the designated route system would be negligible in that the same open route system designated in Alternative A would be utilized in this area. The net impact on recreational opportunity would probably be negligible in the short term, but more substantial in the long term in that the designation of the area as a Recreation Area would give some surety into the future that this area would be managed primarily for the recreational opportunities and resources. Recreational use of the area could increase, as this fact became more widely known due to the Recreation Area designation.

4.6.4 Cultural Resources

Expansion of the Spangler Hills Open Area would expose archaeological resources on these acres to uncontrolled vehicle use. The CDCA Plan inventory data indicated that site densities in this area average around 4.5 sites per square mile. A decision to open this area would require inventory of the expansion area and mitigation of impacts to affected cultural resources. It would result in loss of any significant resources in the area. Lack of inventory precludes more detailed description at this time. Similar impacts and requirements for inventory and mitigation would apply to the establishment of a Fremont Recreation Area near Cuddeback Lake. Establishment of a corridor for enduro events would impact cultural resources in the corridor but without a specifically identified route the nature and extent of such impacts cannot be predicted. Since this alternative would use the motorized vehicle access network described in Alternative A those impacts would be the same.

4.6.5 Cumulative Impacts

Livestock Grazing: Similar to Alternative A. The Harper Lake (17,345 acres), and Cronese Lake (30,000 acres) allotments would have additional portions of the allotments that would have grazing discontinued and the remaining portions of the allotments would not be viable enough to have any grazing continue. This would increase the cumulative effects for this alternative by approximately 47, 345 acres of public land loss to future livestock grazing.

Biological Resources: Cumulative impacts of Alternative E to biological resources would most likely be significantly greater than Alternative A because no additional conservation measures would be applied in the Pinto Mountains or Ord Mountains areas. Expansion of the Open Areas would cause degradation of additional habitat. The incremental contribution of

future projects within the areas not designated as DWMAs combined with the expanded Open Area designations could be significant.

Alternative E would substantially increase the area of incidental take for the desert tortoise. This increase outweighs the additional protections provided within the single DWMA, and is a significant adverse impact.

Minerals: Cumulative impacts to mineral resources would be similar to Alternative A.

4.7 ALTERNATIVE F: NO DWMA – AGGRESSIVE DISEASE AND RAVEN MANAGEMENT

Impacts would be as described for Alternative A, except as discussed below.

4.7.1 Air Quality

Most of the activities associated with Alternative F would not result in any impacts to air quality. Impacts from Livestock grazing and OHV routes would be similar to Alternative A. Impacts from the restoration of existing ground disturbance would be similar to Alternative A, but smaller due to less land area involved.

4.7.2 Biological Resources

4.7.2.1 Natural Communities

Without designation of DWMAs, landscape-level protection of natural communities is problematical, at least in the areas outside the MGS and species-specific conservation areas. In the Newberry-Rodman Mountains, Pinto Mountains and the Coyote Basin south of Fort Irwin, the focus on disease and predator protection for the desert tortoise would not provide and benefit to natural communities. Natural communities in these areas, which are dominated by creosote bush scrub and saltbush scrub, would be subject to fragmentation by dispersed developments on private lands. Other communities that would be impacted to a greater extent than Alternative A include desert washes, playas and some mountainous areas containing Mojave mixed woody scrub.

4.7.2.2 Desert Tortoise

Alternative F's conservation strategy differs from other alternatives, in that it proposes a tortoise conservation strategy that relies on an aggressive program of tortoise disease management and raven control supported by an extensive fencing program, rather than the establishment of DWMAs to protect tortoise habitat. Thus the highest funding priority would be given to controlling disease and ravens, and no DWMAs would be designated (see Map 2-21). Weakness and strengths associated with this alternative are given in Table 4-61.

Table 4-61
Tortoise Impacts of Alternative F

BENEFITS	RESIDUAL IMPACTS
DWMA DESIGNATION AND CONFIGURATION	
DWMAs Not Established	DWMAs Not Established (AF-1) • Failure to establish a tortoise conservation area to protect tortoise habitat is a very serious flaw. Degraded habitats are very likely associated with disease, and increased raven populations are definitely associated with degraded habitats, yet this alternative would focus on animals, not habitat. Establishing the 1,863 mi^2 MGS CA in the north and northwestern portion of the planning area would do very little to accomplish this goal. Although the MGS CA covers portions of the excluded DWMAs in the south and central part of the planning area, proactive tortoise prescriptions would not apply. (AF-1) • The benefits associated with DWMA establishment given in Alternatives A, B, C, and D would not be realized. Impacts identified in those alternatives would be elevated.
Recent and Current Tortoise Occurrence •	Recent and Current Tortoise Occurrence • Since DWMAs would not be established, the following areas would not benefit from proactive management of habitats and tortoises **Does not establish conservation areas for:** • 11,134 mi^2 within the 2002 range • 563 mi^2 of higher density areas • 424 tortoises observed during recent surveys • 2,317 mi^2 of USFWS critical habitat • 1,398 mi^2 of BLM Category I habitat and 548 mi^2 of Category II habitat
Management in BLM Categories and Critical Habitat	Management in BLM Categories and Critical Habitat • Since there would be no DWMAs, the context for implementing conservation measures in DWMAs versus ITAs would no longer apply; take would be authorized for all areas equally, but predictably affect more private lands than public lands
Land Management in Adjacent Areas	Land Management in Adjacent Areas • Failure to establish DWMAs would raise the chance of impacts to adjacent conservation areas, including • Critical habitat at Edwards AFB • Tortoise management area at China Lake NAWS • JTNP management adjacent to the excluded Pinto Mountain DWMA

BENEFITS	RESIDUAL IMPACTS
EXISTING MANAGEMENT IN LIEU OF ESTABLISHING DWMAS AS ACECS	
Critical Habitat Protection in Lieu of DWMAs • BMPs, tortoise surveys, fee compensation, etc. would be somewhat more protective in critical habitat, but all fall short of higher level protections identified in Alternative A, since the focus here would be ravens and disease, not minimizing impacts to habitat • There would no longer be an issue of management conflicts associated with critical habitats inside and outside DWMAs, since conservation areas would not be designated	Critical Habitat Protection in Lieu of DWMAs • Critical habitat designation only allows the USFWS to determine adverse modification of critical habitat on public lands. It does not provide, by itself, a pragmatic and proactive management program. In fact, an "adverse modification" finding has never been made in the West Mojave since the 1994 designation.
BLM ACEC Management	BLM ACEC Management • The advantages of ACEC management identified in Alternatives A and B would be lost
BLM Management of Category I, II, & III Habitat • Management goals for Category I and II habitats would remain in place, and in general, provide management direction that provides some minimal benefit for tortoise conservation (see right)	BLM Management of Category I, II, & III Habitat • Tortoise management under BLM's habitat category guidelines has meaningful goals, but specific ACEC management prescriptions would be necessary to realize those goals. Since ACEC's would not be established, future management would continue to only identify goals without specific management actions to realize those goals. Management relative to habitat categories would have little meaningful application to tortoise conservation, and result in perpetuating existing problems.
Sign Count Surveys and Designation of "Survey" and "No Survey Areas" • Sign count data collected between 1998 and 2001 allowed the detection and delineation of older and newer die-off regions throughout the planning area. These observations were based on detecting tortoises that had died more than and fewer than four years of being found. This is a very useful tool that would be expanded upon under this alternative. As such, sign count surveys would be performed on an annual basis in all areas currently identified as regions of higher tortoise densities. Such surveys would be performed in all such areas, including Category I and II habitats, critical habitat, and BLM open areas. In time, these surveys may also be required in lower density and extirpation areas if there is reason to believe that those areas are becoming repopulated. The intent would be to detect new die-offs in regions currently supporting higher tortoise densities. The frequency of the surveys on an annual basis would be required to allow for immediate containment of the disease spread. Emergency fencing, discussed below, would be strategically placed along existing roads to contain the disease	Sign Count Surveys and Designation of "Survey" and "No Survey Areas" (AF-16) • The requirement to complete presence-absence surveys in all areas and clearance surveys where tortoise sign occur, does not lend significantly to disease or raven management. Again, these surveys are intended to offset the impacts of new construction, and would not appreciably add to either raven or disease management (AF-16) • Under this alternative, there would be no designation of tortoise "No Survey Areas." Whereas this would avoid the possibility of impacting tortoises where they are not expected to occur (a beneficial or neutral impact, at best), the alternative would result in continuing current management, and would result in substantial costs to project proponents who would continue to pay for surveys in areas where tortoises are not likely to be directly affected • Annual sign count surveys associated with this alternative may be costly, although they would be substantially less expensive than distance sampling.

BENEFITS	RESIDUAL IMPACTS
Distance Sampling • Data used to identify older and recent die-offs strongly suggest that distance sampling as applied in 2001 and 2002 would fail to detect newer die-off regions. Alternative F proposes a substantially more meaningful and less expensive way to identify die-offs than what is proposed under Alternative A. Distance sampling should be conducted in higher density areas where a sufficient number of tortoises could be detected to satisfy the minimum sample size of 80 tortoise/stratum required by the statistical analysis associated with the method. This would result in relatively accurate estimates of densities, but may still fail to detect die-offs in a meaningful manner. Alternative F's proposal for a combination of distance sampling (for density estimates) and sign count surveys (to detect die-offs) is an effective use of both techniques.	Distance Sampling Failure to apply distance sampling in all regions, including extirpation areas, may preclude some ability to detect natural increases in those tortoise populations, although the chances of such increases are doubtful without proactive management programs and intervention like head starting.
Emergency Fencing in Response to Disease (AF-15) • Proactive disease management would require a new kind of fence, not envisioned by Alternative A. Using data from annual sign count surveys, managers would need to see where disease continues to spread into previously unaffected subpopulations. Depending on the new distribution of the die-off, it may be possible to remove previously installed fences and use that material in the newly identified area, which would minimize the cost of fencing materials	Emergency Fencing in Response to Disease • Although these fences are likely the only means to stop spread of disease, there is no guarantee they will function as in tended. For example, placing a fence along the diagonal road southeast of the recent Kramer Hills die-off may not enclose diseased animals that are already south of that road. • This management scenario would be costly and would demand a high commitment of staff time.
Plan Implementation • Has the same advantages of Alternative A, since a Section 10(a) permit would be issued to participating counties and cities (i.e., unlike Alternative B)	Plan Implementation
Federal Permitting • Same advantages as Alternative A	Federal Permitting • Same disadvantages as Alternative A, with one major difference: the USFWS' minimize and mitigate to the maximum extent practicable standard would not be met. . Both raven and disease management target *animals*, when in fact, both ravens and disease are likely associated with degraded *habitats*. Also, the alternative fails to address vehicle impacts, poaching, gunshot mortalities, vandalism, release of ill pets, and many others.
State Permitting • Same advantages as Alternative A	State Permitting • Adverse impacts same as those given above for federal permitting

BENEFITS	RESIDUAL IMPACTS
Compensation & Fee Structure • Compensation would be commensurate with the severity, type, and location of authorized impacts, which would provide for take and habitat loss that would not exceed the level of conservation provided for in return (AF-4) • Maintaining the 5:1 compensation ratio within the MGS HCA and tortoise critical habitat would have similar benefits as given for Alternative A • Would still result in consistent, unified mitigation structure that would avoid current inconsistent approaches among and within permitting authorities	Compensation & Fee Structure • Fees for construction of single-family residences in DWMAs would no longer apply under this alternative
MAINTAINING CURRENT MULTIPLE USE CLASSES	
Maintaining Multiple Use Classes • Class L lands would continue to be managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished	Maintaining Multiple Use Classes (AF-3) • For reasons given above, changing BLM's multiple use Class M lands to Class L in the northern portion of the MGS Conservation Area would have little benefit to desert tortoise conservation where it is most needed (i.e., in higher concentration areas and in recent die-off areas) • Multiple use classes would remain unchanged, so the types of development that would be allowed in Class M and unclassified areas (e.g., new nuclear power plants, new agriculture), depending on their location and prevalence, could constitute a significant impact; see Alternative A for additional impacts • Inconsistent with BLM's NECO and NEMO plans for CDCA public lands, where Class M and unclassified public lands throughout DWMAs were re-designated as Class L to provide relatively more protection
No ACEC Prescriptions to Supercede Class M	No ACEC Prescriptions to Supercede Class M • Would allow for the following types of development and uses on Class M and unclassified public lands in DWMAs: new agriculture, including biosolids fields; development of nuclear and fossil fuel power plants; discretionary approval of routes by BLM Field Manager without level of review called for in Class L; recreational events on "existing" routes of travel as opposed to "approved" routes of travel; and pitting, starting, finishing, and spectator areas would be allowed

BENEFITS	RESIDUAL IMPACTS
1% ALLOWABLE GROUND DISTURBANCE	
Function to Minimize Impacts • Under this alternative, there would be no 1% AGD; impacts are given to the right	Function to Minimize Impacts • Same impacts identified for Alternative A would apply, but following impacts would also occur: (AF-5) • Failure to apply the 1% AGD either within or outside the HCA would result in unrestricted development throughout all tortoise habitats. Although most of these areas are not likely to be developed in the next 30 years, there would be no constraints associated with authorized development • As more and more of the non-conservation area is developed, both disease and raven management would be seriously undermined. Increased urbanization provides resources that will predictably result in more food and water resources for ravens. In the absence of the 1% AGD, this type of development would be unrestrained and likely support raven populations in areas where they are supposed to be managed • Implications are similar for disease management. Disease very likely is associated with degraded habitats, release of captive ill animals, etc. As urbanization and other unauthorized development proceeds in an unrestricted manner, the interface between new sources of disease and the disease management area (if there is one) would increase and seriously undermine any advantages realized through these management programs • On both local and regional scales, would allow authorized development to extirpate both lower and denser tortoise populations, sever critical linkages, etc.
PRIVATE LAND ACQUISITION AND PUBLIC LAND DISPOSAL	
Acquisition Priorities (AF-8) • One advantage of this alternative is that more money would be available for land acquisition because many of the programs identified in Alternative A would not need to be funded. However, acquiring lands in the absence of a definite conservation area would undermine any advantages gained, as newly acquired lands would be open to unrestricted development (i.e., see discussion under 1% AGD and elsewhere).	Acquisition Priorities (AF-8) • Land acquisition, alone, would fail to promote either disease or raven management. In fact, maintaining land acquisition as a high priority would divert funds from disease and raven management programs that were not acquisition- dependant (AF-8) • The BLM would not be obligated to retain all public lands within DWMAs for purposes of tortoise management, since tortoise conservation areas would not be established
BLM Management	BLM Management • Alternative F would fail to facilitate signing, fencing, canine predator management, etc. programs
Motorized Vehicle Access	Motorized Vehicle Access • Alternative would fail to facilitate route designation and implementation of route closures on existing public lands. Nor would it ensure that route designation on newly acquired lands would occur in a timely manner and ultimately benefit the conservation program

BENEFITS	RESIDUAL IMPACTS
NEW AGRICULTURAL DEVELOPMENT	
	• Unchanged current management would allow agricultural development on BLM Class M and unclassified public lands, including many higher density areas
COMMERCIAL FILMING ACTIVITIES	
	• Alternative would fail to result in programmatic implementation of protective measures on private lands, which are identified in Alternative A • Maps and brochures would not be produced to direct filming impacts away from higher density areas
CONSTRUCTION ACTIVITIES	
	• New construction of landing strips and airports, and new nuclear and fossil fuel power plants, would be allowed on BLM-designated Class M and unclassified lands, but would not be allowed on Class L lands. Given the coincidental occurrence of Class M and unclassified lands with much of the habitat supporting the highest tortoise densities, this type of new construction would be allowed in such areas • Significant beneficial impacts associated with 1% AGD, clearance surveys throughout excluded DWMA lands, etc. would not longer occur, and cumulatively result in adverse significant impacts • Ravens often visit places where new ground disturbance is occurring, where they have been observed eating lizards, snakes, and small mammals that are injured or killed by blading and other construction activities. Wherever new construction results in removal of ground cover, one can predictably expect to encounter ravens that would otherwise not be there. This sort of focal behavior will always hamper the efficacy of raven management. That the 1% AGD would no longer apply means that ravens would occur in association with new construction areas, including those where higher density tortoise areas would be exposed to increased potential for tortoise predation
Best Management Practices (AF-14) • The intent to implement streamlined Level 1 BMPs in Category I and Category II tortoise habitat and Level 2 BMPs elsewhere would benefit tortoises, in general, but would not appreciably affect disease and raven management. BMPs are intended to minimize direct impacts associated with construction, which is outside the focus of raven and disease management	Best Management Practices (AF-14) • The efficacy of implementing BMPs would be undermined because the 1% AGD would not be required and construction would be authorized in all areas
Single-family Residences	Single-family Residences • Allows for construction of single-family residences in all areas without clearance surveys, or mandatory reporting of the number of tortoises affected, which is a continuation of current management, but not likely a significant impact, as most homes would be constructed in 1/2:1 compensation areas

BENEFITS	RESIDUAL IMPACTS
Special Review Areas	Special Review Areas (AF-2) • Not establishing Special Review Areas would result in marginal adverse impacts, as the SRAs identified in Alternative A already fail to protect higher density areas outside the Brisbane Valley and Copper Mountain Mesa area.
DISEASE MANAGEMENT	
• This is the main place where Alternative F would be far superior to Alternative A. Annual sign count surveys, emergency procedures to erect fences to thwart spread of disease, closing culverts under highways and freeways, etc. are far more proactive than the program identified in Alternative A • Prescriptions given below relative to raven management would require implementing an extensive road-fencing project on all freeways, highways, and secondary roads in the vicinity of tortoise habitat. Fences would also prevent the spread of URTD and other diseases, which would facilitate the prescription to close existing and newly constructed culverts	• The impacts discussed above with regards to surveys, fencing, and culvert closure would also apply here
DROUGHT	
Motorized Vehicle Access	Motorized Vehicle Access • Minimizing vehicle use in washes, the single most effective measure to alleviate human impacts during time of drought, would not be implemented under this alternative, and likely result in significant impacts • Alternative F fails to identify specific measures that would be implemented in higher density tortoise areas, which are most likely to benefit from additional protection during periods of drought; temporary, emergency closures of additional routes in higher density tortoise areas would have resulted in less stress than would occur with Alternative A, and may be particularly important with regards to disease

BENEFITS	RESIDUAL IMPACTS
EDUCATION PROGRAM	
• The education program would be directed towards enhancing public awareness about ravens and disease • For ravens, the program would necessarily be directed towards utility companies, landfill operators, sheep and cattle ranchers, and recreationists. This latter group would be particularly important, as ravens are known to frequent high use areas where increased levels of litter and other refuse have been observed. • For disease, the program would need to target pet owners to inform them that no tortoises are to be released into the wild.	• This program would be difficult to implement, as many visitors to the desert are spread throughout southern California, and it would be difficult to target the "right" audience • The education program would fail to curb the prevalence of poaching, pet collection, vandalism, gunshot incidence, etc., as these impacts are not directly related to either disease or raven management • The education program would not be directed to construction workers, which would have been intended to minimize construction impacts, not impacts associated with ravens or disease
ENERGY AND MINERAL DEVELOPMENT	
<u>New Development</u> (AF-9) • The prescriptions to allow for mineral extraction from all areas; requiring BLM Plans of Operation in Class L; continuing to regulate mines less than 10 acres under the existing biological opinion; and continuing implementing SMARA regulations are the same as for Alternative A.	<u>New and Existing Development</u> • Reclaiming areas rather than restoring them would fail to re-establish tortoise habitat, which may lead to undermining the efficacy of both disease and raven management. Reclamation would result in re-contouring surface disturbances and other minor remedies; restoration would include reclamation activities, but go a step further by providing habitats that may be available for re-occupation by tortoises. • Development of new mines and expansion of existing mines would no longer be subject to the 1% AGD, however since most mining would be on BLM lands, this impact would not likely be significant. • Does not adequately address how existing and new contamination associated with mining activities would be remedied and avoided, respectively • Fails to indicate how impacts associated with new haul roads would be minimized or avoided
<u>New Exploration</u>	<u>New Exploration</u> • Would fail to include new standards to minimize temporary impacts. Since there is no 1% AGD, these impacts would not likely be minimized or mitigated.

BENEFITS	RESIDUAL IMPACTS
FERAL DOG MANAGEMENT	
Feral Dog Management • Benefits associated with feral dog management would be particularly important during periods of drought, when feral dogs may be more likely to prey of tortoises as other prey items become less available	Feral Dog Management • There would be no feral dog management plan, which was to be the means to determine where this impact is most prevalent. At this time, in the absence of other data, feral dogs are known to be a problem on the western and southern portions of the 29 Palms Marine Corps Base and at he DTNA; the problem is likely to be more widespread. Though not supported by data, feral dogs are likely to be a problem in the southern part of the Fremont-Kramer, west of Silver Lakes; it is likely that they also affect higher concentration areas around Barstow and north of Hinkley. • Feral dogs would continue to injure adult tortoises and likely kill smaller animals, due to Alternative F's focus on raven and disease management. • Given that there would be no 1% AGD, all private lands would be available for development. As urbanization approaches the heart of higher concentration areas (not likely in the next 30 years, except for the places given above), feral dogs would increase as a problem and eventually comprise a significant adverse impact
FIRE MANAGEMENT	
• Same as Alternative A	• Same as Alternative A
CATTLE GRAZING ON BLM ALLOTMENTS	
	• The grazing of cattle provides water (i.e., troughs, standing water from leaking pipes, etc.) and food (i.e., cattle carcasses) for ravens that would continue to be available under current management. No new prescriptions would be identified under this alternative, so these resources would remain available to ravens • It is not clear how cattle grazing relates to disease transmission, although available data suggest that there have been no older or newer die-offs in cattle allotments, per se. If disease is associated with poor nutrition and other variables associated with degraded habitats, it may be that disease management would be hampered by maintaining cattle grazing under current practices
• Cattle grazing would not be removed from Exclusion Areas, thus avoiding impacts associated with concentration of livestock grazing in non-exclusion areas.	
	• Fences to minimize trespass would not be installed, and cattle trespass outside the Ord Mountain Allotment would continue unabated
	• Ephemeral allocations would be allowed and, when permitted, would allow for increased competition between cattle and tortoises

BENEFITS	RESIDUAL IMPACTS
	• Temporary Non-renewable grazing allocations would be allowed and, when permitted, would allow for increased competition between cattle and tortoises
	• Since ephemeral grazing would not be removed, the Pilot Knob Allotment would remain available for cattle grazing. Such grazing would not occur so long as the DTPC continues to be the lessee, but cattle ranchers would have the opportunity every two years to solicit a lease on this ephemeral-only allotment
	• Cattle troughs would continue to provide an otherwise unavailable water source to common ravens, which may undermine the efficacy of the raven management program • Removal of cattle carcasses would be at the discretion of the lessee. If carcasses are not removed in a timely manner, the efficacy of the raven management plan may be somewhat undermined
• If and when health assessments are completed, it would be necessary to assess allotments for their contribution to subsidizing raven populations. There is too little information at this time to assess allotments for their potential to contribute (or not) to disease management, as the relationship between cattle grazing and spread of disease remains unknown	• There would be no requirement to complete health assessments in a timely manner.
SHEEP GRAZING ON BLM ALLOTMENTS	
	• Sheep grazing would continue on the 14 mi^2 of the Shadow Mountain Allotment and adversely affect tortoises, including higher concentration areas on those lands
	• Grazing allotments would remain as designated in the CDCA Plan. Although they are currently not grazed due to the 1991 biological opinion, there are annual requests of the BLM to graze these allotments. If grazing were permitted in the future, it would lead to a very significant adverse impact
GUZZLERS	
• An immediate guzzler study would identify guzzlers that subsidize ravens in places where the overall raven management plan would be undermined	
HABITAT CREDIT COMPONENT	
Success Criteria (AF-6) • Continuation of restoration and reclamation programs would benefit tortoise conservation, as they would focus on reclaiming habitats on which tortoises rely. Discontinuing the habitat credit program would avoid the potential impacts identified for this program in Alternative A.	Success Criteria

BENEFITS	RESIDUAL IMPACTS
HEAD STARTING PROGRAM	
	(AF-17) • There would be no head-starting program. As such, there would be no attempt to repopulate areas that were recently populated and likely now extirpated due to disease. This is a weakness of Alternative F's disease management strategy, as all available evidence suggests that disease was responsible for both older and new regional die-offs, and a head-starting program would have complemented the other proactive disease management measures. In the absence of establishing a conservation land base (i.e., DWMAs), disease management must address the foreseeable reality that disease will spread in spite of any proactive programs to protect existing populations that may already be exposed to URTD. Tortoise populations that exist as of 2003 may already be diseased, and the patterns of die-off suggest that the entire tortoise population is susceptible to extirpation in the next 5 to 10 years. Disease management would fail if it is intended to protect only those animals that remain; it must also provide a means for replacing populations lost to disease. The only means of doing this is through head starting. The best places to do this are in areas where significant tortoise populations once occurred. As such, all areas between the DTNA and Cuddeback Lake are prime targets for head starting
	In any event, Alternative F lacks many of the ancillary programs that would be needed to ensure the success of a headstarting program. Dr. Nat Frazer has argued convincingly that head starting will fail if the threats that eliminated the species in the first place are not removed from the landscape. For tortoises, this would mean fencing all head starting areas to preclude impacts from those nursery colonies and surrounding areas that are intended to be repopulated. For the West Mojave, this means eliminating vehicle travel and sheep grazing, among others, from these head starting regions. • For example, rather than reducing routes, all routes within the nursery area would no longer be available for vehicle travel. If annual sign count surveys show that a new die-off region is within a BLM cattle or sheep allotment, grazing pressures must be immediately removed from those areas. If new disease outbreaks occur in BLM open areas, fences would need to be installed in those areas, which would result in increased potential for vehicle collision with the fences. In open areas, it may be necessary to erect chain-link fences to provide for more visibility than the shorter tortoise fences in order to avoid this foreseeable danger to recreationists

BENEFITS	RESIDUAL IMPACTS
LAW ENFORCEMENT	
Focused Enforcement in DWMAs (AF-12) • Continuing law enforcement and BLM ranger patrols at current levels, and not hiring new staff, would not seriously undermine the efficacy of this alternative. However, it would require a new focus by rangers and patrol officers to be sure that they are in the appropriate places. For example, ranger patrols should be focused in higher concentration areas to minimize dumping, illegal camping, and other human uses that provide resources opportunistically be used by ravens. Increased and focused law enforcement may also minimize the number of sick captive tortoises being released in these areas, in support of heightened disease management	Focused Enforcement in DWMAs (AF-12) • Though a good faith effort is implied, Alternative F fails to indicate how BLM could obligate its law enforcement staff, without new personnel, to ensure this measure would be implemented; failure to identify a mechanism could result in discretionary, inconsistent implementation
Facilitated Coordination	Facilitated Coordination • There is no indication under this alternative that there would be increased co-operation between BLM law enforcement and other entities, which would undermine the efficacy of the raven and disease management programs

BENEFITS	RESIDUAL IMPACTS
MOTORIZED VEHICLE ACCESS NETWORK	
Overall Importance	Overall Importance • Designating and implementing a motorized vehicle access network that is supported by land use laws and compatible with tortoise recovery is *the single most important management action* that could be implemented to minimize the widest variety of known human impacts (see Alternative A). Under Alternative F, funding and staff would be applied to raven and disease management, which would result in a lower funding and staffing priority for the implementation of the route network and other measures. As such, failure to protect habitats would constitute a significant adverse impact
For Animals and Habitat	For Animals and Habitat • Tortoises would continue to be susceptible to: pet collection; animals, burrows, and eggs crushed; gunshot impacts; handling that results in bladder voiding; harassment or mortality by pet dogs; poaching for ceremonial purposes; releasing pet tortoises into wild populations, which may spread disease; translocation, where tortoises are moved outside their home range into other habitats; and vandalism. • Habitats would continue to be susceptible to soil compaction, displacement through wind and water erosion, petroleum contamination; spread of exotic weeds, which supports spread and intensity of fire; damage and complete removal of shrubs, which reduces protective cover and burrowing opportunities; dumping (which leads to more dumping), resulting in soil contamination, food sources for ravens, focal areas for illegal target shooting; increased litter and garbage used as a food source by ravens; and increased noise levels (though effects are not well known).
Route Reductions in Specified Regions • Even though DWMAs would not be established under this alternative, the motorized vehicle network analyzed for other alternatives (excepting Alternative G) would have the same beneficial impacts.	Route Reductions in Specified Regions • Same as Alternative A and others (excepting Alternative G)
PLANT HARVEST	
• Would result in no change over current management with regards to plant harvest, which at this time is already minimal	

BENEFITS	RESIDUAL IMPACTS
RAVEN MANAGEMENT	
Coordination and Participation • Focusing limited funding on raven management would have the positive effect of facilitating implementation of prescriptions in light of limited budgets and staff • Given the higher importance of raven management, the USFWS' role in proactively managing ravens would be considerably more effective and receive broad public support, which would significantly increase the efficacy of this proposal compared to other alternatives • Participation by SCE and LADWP would be required. Their participation would ensure that protective measures are implemented for extensive reaches of existing utilities, that raven salvage permits would be acquired and used, and results would be reported to the USFWS	Coordination and Participation
Highway fencing • Fencing all major highways and secondary roads would be a very high priority that would result in a significant decrease in the amount of food available to ravens. Dr. Boarman has estimated that there is an 88% reduction in the number of vertebrate animals killed along fenced compared to unfenced roads • Fencing would also have the compartmentalizing effect of minimizing the likelihood of disease spread. Although populations on a given side of the fence would still be vulnerable, it would predictably minimize the spread of the pathogen to tortoises on the other side of the fence. This effect would be somewhat alleviated by implementing the expanded head starting program given above to repopulate such areas. Since the fences would be maintained as impassable barriers, this would have the dual effect`t of enhancing the efficacy of the head starting program as well	Action Items • Proactive raven management would require fencing of 740 linear miles of roads (i.e., this includes 370 linear miles of roads with fences on both sides). Given the projected cost of about $7.50/linear foot to construct such fences[15], it would cost $29,304,000. Roads are listed below: Red-Rock-Garlock (21 linear miles) Randsburg-Red Rock (9) Interstate 15 (41) Interstate 40 (30) Highway 395 (56) Highway 247 (16) Highway 62 (11) Highway 58 (51) Shadow Mountain (12) Mojave-Randsburg (23) Helendale (10) 20 Mule Team (19) Neuralia (13) W Cal City Blvd (8) E Cal City Blvd (8) Irwin Road (9) Fort Irwin Road (23) (Miles in parenthesis are linear lengths of roads to be fenced)
Landfills	Landfills • Proposal does nothing to minimize impacts associated with the Barstow Regional Landfill, which occurs within a few miles north, east, and west of higher density areas. This location would result in significant adverse impacts on the efficacy of the raven management plan to minimize raven impacts • Given that the 1% AGD concept and establishing DWMAs would no longer be considered, construction and new development would be allowed on all private lands within the planning area. This would also mean that the restriction of no new landfills within five miles of DWMAs would be abandoned. As such, new landfills could be

15 CalTrans District 8 indicated that highway fencing has cost between $5.00 and $10.00 per linear foot, so the average of $7.50 is used in the text.

BENEFITS	RESIDUAL IMPACTS
	constructed on all private lands and public lands in Class M and on unclassified public lands. This would result in serious adverse impacts to the raven-management only nature of this alternative
Raven Eradication • Although salvage permits to remove raven nests is expressly given as part of this alternative, it does not indicate intent to eradicate adult ravens. Presumably, there would also be the need to remove ravens.	Raven Eradication • If eradication would be required, as suggested by sole management of ravens, it is very likely to meet with public disapproval. Raven eradication was met with strong opposition when such a program was proposed in the late 1980's. The compromise was to eradicate only those ravens where there was positive evidence of tortoise predation. Given that this strategy focuses solely on raven management, it may be necessary to remove all ravens that are in the vicinity of higher tortoise concentrations and not just those where raven predation is documented
RECREATION ACTIVITIES	
Competitive Events (AF-7) • Allowing motorized vehicle speed events on a case-by-case basis, and requiring environmental assessments would be a beneficial impact if, in particular, these uses are directed away from tortoise concentration areas	Competitive Events (AF-7) • Intense, concentrated recreation is known to be associated with aggregations of people and be associated with increased camping, litter, and a raven "curiosity factor." Ravens are known to fly in from long distances and circle above even a few people, presumably looking for potential foraging opportunities. This behavior would be expected in association with all activities, including competitive events, where people congregate. The impact would be concomitant with the number of tortoises in the area, so competitive events in the vicinity of higher concentration areas would likely result in relatively more serious impacts
Competitive Event Corridors • Mandatory implementation of "yellow flag" conditions paid for by the proponent for events using the Stoddard-to-Johnson Valley and Johnson Valley-to-Parker corridors would eliminate the competitive "race" nature of the event (i.e., it would be more like a dual sport)	Competitive Event Corridors • New, frequent use of the Stoddard-to-Johnson Valley and Johnson Valley-to-Parker corridors for competitive events would result in impacts to higher concentration areas (as described above) with increasing familiarity, popularity and casual use of the corridor • The Stoddard to Johnson Valley Corridor has higher density areas associated with the northern and southern portions of the corridor. The Johnson to Parker Corridor skirts such an area.

BENEFITS	RESIDUAL IMPACTS
Dual Sports • Maintaining dual sports as regulated would continue to increase participant awareness of tortoise conservation measures (i.e., non-competitive, restricted to existing route width, 35 mph speed limit, seasonal restrictions, etc.), has resulted in no known loss of tortoises, and would provide for compatible vehicular use, so long as currently regulated • BLM would revise its educational materials provided to dual sports participants to indicate that both adult, and particularly hatchling, tortoises may be active at Thanksgiving, and that riders should watch for and avoid such animals, which would make riders aware that tortoises could be out and should be avoided • This alternative would also require the BLM to increase its educational outreach with regards to raven impacts to minimize the amount of litter, refuse, pet food, water, etc. available to ravens as a result of an otherwise low impact activity	Dual Sports • The same effects identified above would also be associated with dual sports and □ndures. Although these events generally would not result in habitat damage or crushing tortoises, they do result in increased concentrations of event participants and associated crowds at staging, starting, finishing, and camping areas. Each of these areas is likely to result in increased raven numbers. The severity of the impact would be governed by the location of these crowds relative to higher and lower concentrations of tortoises
Other Conservation Measures (AF-15) • The fencing program of Alternative A would need to be greatly expanded under Alternative F, although there would be no need to fence DWMAs. Fences along Highway 247 and Camp Rock Road would effectively minimize vehicle impacts (i.e., increased litter, increased potential for crushing by cross country travel, etc.), all of which are likely to promote increased raven use in the area • Installation of a *new fence* between the Johnson Valley Open Area and the Ord-Rodman DWMA would minimize recreation impacts that are not otherwise regulated by this alternative (i.e., no changes in management of open areas) (AF-7) • Restricting vehicle camping, stopping and parking on public lands to within 100 feet of designated open routes on Class L lands, and within 300 feet elsewhere, would have the same advantages given in Alternative A and described elsewhere in this alternative • Each of these measures provides for increased law enforcement capabilities, which would otherwise remain at current levels • The *education program* would be especially tailored to minimize attracting ravens and releasing captive, ill animals, both of which would be positive effects relative to disease and raven management	Other Conservation Measures (AF-10) • The prescription to allow dogs off leash under the control of their owners in Category I and II tortoise habitat is inconsistent with the goals of Alternative F, as it would fail to support either raven or disease management. Predation by feral and domestic dogs is a separate impact from raven and disease impacts, and is not consistent with the alternative's intended function (AF-15) • The alternative envisions no need to install signs, as no DWMAs would be established. It would have been more efficacious had signing been used in conjunction with both raven and disease management. For example, strategically placed signs in conjunction with higher density areas may have prevented dumping and litter in an attempt to minimize the attractiveness of these areas to ravens. The alternative also misses the opportunity to install signs that would inform the public that release of captive animals could result in the spread of disease.
Gunshot Impacts • Increased law enforcement may result in less violation of current statutes regulating hunting and target shooting practices, but only if law enforcement can be focused in higher density areas	Gunshot Impacts • This alternative is seriously flawed with regards to minimizing gunshot impacts, as neither raven nor disease management would serve to curtail this continuing impact.

BENEFITS	RESIDUAL IMPACTS
TRANSPORTATION	
Highway Fencing (AF-11) • Under this alternative, Caltrans involvement must be much higher than given in Alternative A. Extensive fencing for raven management would reduce the amount of food available to them. Immediate closure of culverts, as an emergency procedure, would help curb the spread of disease, although this measure may already be too late.	Highway Fencing • If there is less carrion available for ravens as a result of fencing roads, there is the potential that, rather than leave the area, ravens may switch to other available forage, including tortoises and other wildlife • If fencing does not occur until road construction (i.e., 2013 to 2015 for Highway 395 widening between Adelanto and Red Mountain), tortoises would in the interim continue to be crushed, and raven forage would be available, which would undermine the efficacy of raven management
Culverts (AF-11) • This alternative envisions a higher level of commitment by Caltrans in terms of closing existing culverts and blocking new culverts to prevent the spread of disease. It appears that open culverts along Highway 58 and Interstate 40 have allowed diseased animals to move from the north to south. Under this alternative, culverts would be closed immediately to reduce the amount of disease spreading to apparently unaffected tortoise populations south of these two roads. As new roads are widened and new culverts built, Caltrans would ensure that they are impassable to tortoises but remain open to allow for water flows, for which they are engineered	Culverts
	• Alternative fails to regulate new road construction by county road departments, which could result in increased raven scavenging in areas where that may not currently be a problem • Dr. Boarman has shown that roads differentially affect subadult tortoises more than adults. Although available information suggests that subadults comprise about 20% of the total population, subadult tortoises crushed along roads comprised about 60% of the carcasses found. His studies also suggest that older subadult tortoises are the age class most likely to make long distance movements; they would be teenagers, if human. These observations suggest that raven and disease management would fail to prevent the loss of this younger age class, which would likely continue to be differentially crushed along roadways until they are fenced

BENEFITS	RESIDUAL IMPACTS
UTILITIES	
Utility Participation (AF-13) • Precluding the construction of new aboveground transmission lines in contingency corridors would provide heightened raven management (AF-13) • Maintenance measures would continue to follow existing procedures, and not seriously undermine either disease or raven management.	
• Program would ensure that maintenance workers of signatory utilities are aware of tortoises and avoid them, and adhere to seasonal restrictions and alternatives identified.	• None, as neither take nor new loss of habitat would be authorized
	• Alternative F would not require revegetation of new rights-of-way in tortoise habitat, which would undermine a practice that is currently required for all new linear developments. Failure to revegetate these alignments would likely mean that corridors disturbed by new pipeline construction would not become naturally revegetated for many years, if at all
WEED CONTROL	
	• Alternative fails to, nor is there any clear means how to, eradicate non-native species that have already become well established, nor would it facilitate better communication with weed management agencies. If, as suspected, poor nutrition is associated with outbreak and spread of disease, failure to implement these programs may seriously undermine disease management

The purpose of this alternative is to determine the feasibility of managing disease and ravens in lieu of establishing conservation areas. It is therefore extremely important to be sure that focused management on disease and ravens would serve to conserve and recover tortoises without establishing conservation areas, which would necessarily result in reducing other legitimate uses of the desert.

The current public land Category 1 and 2 habitat designation, as well as existing BLM programs, would be retained, as would critical habitat. Much of current management, such as commercial filming on BLM lands and fighting wildfires, were judged sufficient. It is important to note, however, that Category 1 and 2, as well as existing CDCA Plan programs, apply only to about two-thirds of the lands within the areas proposed for DWMA status by Alternative A, much of which occurs in a checkerboard land ownership pattern. Current management, moreover, has failed to address a number of issues and threats that can be better addressed if conservation areas are established. From the perspective of tortoise conservation, this is a significant shortfall when compared to the benefits of the establishment of a conservation area applicable to all lands within its outer boundaries.

The alternative is founded on the assumption that disease and ravens are the primary threats affecting tortoises in the planning area, and that establishing conservation areas would be uncalled for. This assumption is probably more accurate for disease than for ravens; and disease appears to be more of a threat to tortoise conservation than are ravens. To address each of these issues fully, the following discussion focuses on raven management, followed by disease management. Following those discussions, the final summary discusses the strengths and weakness of implementing these programs instead of establishing conservation areas.

Raven Management: There is undeniable evidence in the literature that ravens prey on tortoises, as opposed to just scavenging dead animals. The following information summarizes salient points taken from Chapter 3, and are reiterated to provide a context for the discussion that follows: (1) Ravens mostly prey on immature tortoises that are up to about 110 mm (+/- 4.5 inches) in length. (2) Tortoises do not become sexually mature until they are about 180 mm (+/- 6 inches) in length. (3) Although carcass information suggests that raven predation was associated with about 10% of the known mortality in about 10% of the carcasses found, these data are insufficient to determine the scope or severity of raven predation. Nor is there any evidence to accurately portray the regional distribution of raven predation. (4) The data suggest that there is very little reproduction and detectable recruitment in areas of older and more recent die-offs. This conclusion is supported by the lack of subadult tortoises throughout most of the die-off regions. (5) The higher density tortoise areas shown on Map 3-7 are a good relative indicator of where subadult tortoises are most common, indicating that 43% of observed subadult tortoises occurred in 15% of the surveyed portion of the planning area.

The intensive raven management actions proposed by this alternative would not be sufficient, by themselves, to conserve or recover tortoises, because prescriptions focus on removal of ravens and nests, in the hope that fewer ravens would be present to prey on tortoise populations. This alone would be insufficient. Individual issues are summarized below:

Managing Ravens in Lieu of Establishing Conservation Areas: No conservation land base would be established under this alternative. This would mean that new construction, which is known to attract ravens even as the land is being brushed, could occur in an unrestricted manner. As such, residential, commercial, industrial, solar and wind energy, and waste management facilities would be juxtaposed to raven management areas. Perhaps most importantly, new landfills could be constructed throughout the planning area, since there would be no conservation area for reference (i.e., no ability to prohibit new landfills *within five miles of a DWMA*). Management under BLM habitat categorization and USFWS critical habitat would not serve to minimize this impact, as those management tools fail to provide, by themselves, for the implementation of proactive management programs.

Continued Subsidization of Ravens: Ravens are known to use food and water sources associated with urbanizing areas. Because there would be no 1% AGD and because all private lands would be authorized for development, urbanization and other forms of new construction would put new raven food and water sources immediately adjacent to raven management lands. Therefore, even if raven management effectively works where implemented, the proximity to

new and old development would seriously compromise the efficacy of the raven management plan. One must remember that ravens are wide-ranging predators and scavengers, known to travel as many as five miles from their nest site to secure food, which they bring back to the nest.

Raven Management Is Not Synonymous with Eradication of Nests and Adult Ravens: There is a misconception that eradication of offending ravens (or all ravens in certain areas) and removal of nests from human structures would effectively serve to eliminate raven predation. Eradication has only been officially practiced one time, by the BLM in the late 1980's. There have been no follow-up visits or data collection to determine any long-term effects or benefits of that program. Between new reproduction and immigration into the area, effective eradication of ravens may be very difficult, or impossible.

With regards to nesting, ravens are extremely adaptable. They readily nest on cliff faces, in Joshua trees, and other natural substrates. Proactive salvage of raven nests from transmission towers and related structures is a laudable action that would have the beneficial effect of minimizing the numbers of ravens supported by those structures. But there is no guarantee that nest removal from human structures will result in fewer ravens. Similarly, although fencing all roads (a draconian measure that would be cost prohibitive) would predictably reduce the amount of available food for ravens, there is no guarantee that this action will cause ravens to leave the desert. It is entirely possible that ravens will remain in the desert and seek out new food sources if the road-killed source is effectively eliminated. This may mean increased predation on wildlife, including tortoises.

Each of these measures and others assumes that removing nests or offending adults would result in fewer ravens and therefore less tortoise predation. There are no data to support this contention; in fact, available information is otherwise. There was no follow-up to the BLM's raven eradication program implemented at the DTNA and 29 Palms Marine Corps Base in 1989. Although a number of ravens were eradicated by both marksmen and poisoning there is no evidence that these reductions had any lasting effects. As given above, ravens are far ranging, aerial predators. The proximity of existing urban and suburban communities puts all higher density tortoise areas easily within the range of a raven's daily foraging patterns. Their ability to disperse in a few weeks or months is even more striking. For example, one raven that was marked with yellow wing tags at the Edwards Air Force Base landfill was seen within several months at the Tehachapi landfill, some 40 linear miles to the west (Ric Williams, pers. comm., 2003).

Failure of the Raven Management Plan to Reduce Other Forms of Mortality: As provided for in FLMPA and elsewhere, recreational events are an authorized activity on public lands managed by the BLM. Ravens are curious predators that are drawn to human activity. Both competitive and non-competitive vehicle events will predictably attract ravens, and depending on their proximity to higher density tortoise areas, could seriously undermine the efficacy of the plan. Available data suggest that between 28% and 32% of the tortoise carcasses found where cause of death was given was attributable to vehicle crushing. The raven management plan would fail to reduce this serious, prevalent impact to the tortoise population.

There is an assumption that raven management would allow for closure of fewer roads. If so, one can expect that tortoises will continue to be crushed by vehicles even if the raven plan is successful.

As envisioned, raven management would have no effect on cattle and sheep grazing in the planning area, both of which are known to degrade habitats on which tortoises rely. Both are also known to provide food and water resources for ravens, including water troughs and livestock carcasses, respectively. Raven management would do nothing to minimize the effects of gunshot mortality, which was associated with about 6% of the carcasses where cause of death was given. Nor would it effectively address pet collection, release of captive animals, intentional vandalism, intentional translocation (i.e., moving tortoises from one part of the desert to another), poaching, and a variety of other impacts associated with vehicle access. For the raven management plan to function in lieu of establishing a conservation area, there would still need to be a significant number of routes closed to minimize these and other mortality factors. However, the alternative does not provide for increased route closure, instead relying on closures identified relative to Alternative A.

Failure to Protect Adult Tortoises and Habitats: One of the most significant flaws with the alternative is it does nothing to protect adult tortoises. Reproductive female tortoises are generally at least 180 mm in length; ravens prey on tortoises up to about 110 mm in length. Therefore, all of the factors discussed above would continue to remove reproductive females from the population even if the raven eradication program were successful in alleviating impacts to sexually immature animals. The other fatal flaw with the alternative – its failure to address the protection or alleviate additional degradation of habitat – is discussed below with regards to focused disease management.

For these and other reasons, focused raven management in lieu of establishing conservation areas would fail to conserve and recover tortoises.

Disease Management: Disease management is founded on the assumption that, as its name implies, disease can be managed. First, it is important to reiterate (see discussion in Chapter 3) that all evidence for disease as the causal factor behind catastrophic die-offs is circumstantial. There are no field-based data or other evidence to definitively support the conclusion that disease is responsible for either older or newer die-offs. Therefore, by extension, there is even less evidence that disease can be "managed".

Circumstantial Information and Evidence: The following information is available from the literature and recent surveys: (1) The pathogen, *Mycoplasma agassizii*, was first isolated from symptomatic tortoises at the DTNA in the latter part of the 1980's. The pathogen was not identified until the early 1990's, by Dr. Mary Brown at the University of Florida, Gainesville. Symptoms in living tortoises included runny noses, swollen eyelids, raspy audible breathing, and mud-caked nostrils. (2) Concurrently, many freshly dead tortoises were discovered on Dr. Berry's permanent study plots at the DTNA. However, gunshot mortalities, canid predation, and crushed tortoises were also observed either inside or outside the fenced area in some of those

carcasses. (3) In 2000-2001, Dr. Berry and pathologists from the University of Florida discovered a second species of pathogen, *Mycoplasma cheloniae*, in the northern Lucerne Valley, in the southern portion of the Ord-Rodman DWMA. (4) Also since 2000, Dr. Berry and Dr. Francesco Origgii have isolated herpesvirus in tortoises in the same area (i.e., southern Ord-Rodman), although ELISA tests have not been completed for this pathogen, which would be necessary to determine the distribution of this newly discovered pathogen.

(5) Sign count data collected between 1998 and 2002 revealed that there are areas of older die-off (> 4 years) throughout the DTNA, through the Fremont-Valley, east to Cuddeback Lake, and south of there near Kramer Junction. (6) These areas correspond to the region in which tortoise declines of between about 70% and 90% were observed on Dr. Berry's permanent study plots between 1979 and 1996. (7) Regions of recent die-off (< 4 years) were identified in January 2003 using sign count data. (8) No permanent study plots occur in the Superior-Cronese DWMA proposed by Alternative A, so permanent trend plot data are not available to compare with these very recent findings. (9) Trend plot data are available for the Kramer Hills, Stoddard Valley, Lucerne Valley, and Johnson Valley study plots. In the first three plots, where declines ranged from 5% (Stoddard Valley) up to 60% (Lucerne Valley), there are neither newer nor older die-off regions. A newer die-off region in the western part of the Johnson Valley coincides with declines on that study plot, which were in excess of 70%.

Pending further input from experts, we assume that newer die-off regions represent recent, catastrophic die-offs that are far-reaching, from the western to the eastern extremes of the Superior-Cronese DWMA, proposed in Alternative A. All available information suggests that these die-offs are associated with spread of disease. The following observations are offered as a working hypothesis:

- It appears that local areas of older die-off first discovered at the DTNA are corroborated by the study plot data collected on the nine square miles studied by Dr. Berry and her fieldworkers. These comparisons suggest that the declines on five of the nine, individual square miles were indicative of a regional die-off that substantially decimated tortoise populations from the proposed Fremont-Kramer DWMA north of Highway 58 from the late 1980's through the early 1990's. This hypothesis suggests that the declines observed on the study plots (local die-offs) were indicative of regional die-offs (north of Highway 58).

- This die-off continues in a limited manner, as evidenced by sign count carcasses of tortoises that have died within four years of being found. This hypothesis is supported by Dr. Berry's findings since 1996 that the populations on the study plots within the fenced DTNA continue to decline (pers. comm., Disease Workshop, November 2002; data remain unavailable, although they were requested on several occasions in 2002).

- There are regions of recent die-offs (< 4 years) throughout the entire Superior-Cronese tortoise population, which threaten to extirpate that population within the next 10 to 15 years. This hypothesis is based on the observation that older die-off regions occurred in the late 1980's, that there are no regions of higher tortoise densities in those areas, and that the higher

concentrations observed in the Superior-Cronese DWMA may suffer the same fate in a similar amount of time.

• Overall, the region-wide distribution of older and newer carcasses suggests either (a) the die-off has spread from west to east or (b) there are separate events to the east that have resulted in recent die-offs, with smaller in-holdings of older die-offs. Whether one event or separate, unrelated events, the pattern suggests that disease has spread regionally or locally and has resulted to substantially diminished tortoise populations. This hypothesis is supported by the absence of higher concentration areas in older die-off regions (extirpation areas) and the presence of higher concentration areas within newer die-off regions. The hypothesis that these die-offs were and are due to disease is not supported by data, but is a working hypothesis to be tested by identified experts.

• Higher tortoise concentrations in the Superior-Cronese DWMA, which overlap with or are adjacent to recent die-off regions are in immediate danger of extirpation. This hypothesis is supported by the same observations given above.

• Recent die-off regions south of Highway 58 represent the spread of disease from north to south through culverts under the highway. Similar regions in the northern portion of the Ord-Rodman have been recently infected by diseased animals moving north to south through culverts under Interstates 15 and 40. Culverts in both areas allow for movement of tortoises from north to south. The "corridor" depicted on Map 3-13 is compelling evidence for this theory, as areas to the west (Barstow) and east (agricultural development between I-15 and I-40) are probably impassable to tortoises, and the recent die-off is immediately south of the only passable region.

• Given these observations, contiguous high-density tortoise areas in the southern portion of the Fremont-Kramer and Ord-Rodman DWMAs are in immediate harm's way of disease spread from north to south. This hypothesis is supported by the absence of recent die-off regions and the presence of higher tortoise concentrations in these two areas.

• Each of the hypotheses given above is weakened by the foreseeable likelihood that more carcasses are likely to occur where there are more tortoises. This weakness is only applicable to recent die-offs that overlap with higher tortoise concentration areas. The hypothesis is supported by the observation that no higher tortoise areas occur in older die-off regions.

• These observations suggest that it was (and is) disease, rather than drought, that was responsible for the die-offs. Although the western portions of the planning area are drier than elsewhere, the dry years of the late-1980's, culminating with the "March Miracle" of 1991, were region-wide. The decade preceding this period, moreover, was significantly wetter than average throughout the entire western Mojave Desert. If drought was the predominant factor, one may expect that older die-off regions would have occurred throughout the planning area. This hypothesis is weakened by the possibility that neither drought nor disease, alone, may be responsible for tortoise die-offs. The older die-off regions west of Highway 395 have been (and continue to be) associated with unusually high levels of recreational vehicle impacts and sheep

grazing, which continue to be prevalent outside the fenced DTNA. Therefore, it is entirely possible that drought was the trigger that caused the die-offs in the northern portion of the Fremont-Kramer; that tortoises stressed by human uses and associated habitat degradation were physiologically susceptible to disease pathogens; and that URTD or some combination of diseases was responsible for the regional population crash, but human use and habitat degradation was the ultimate cause.

Implications For Future Disease Management In The Planning Area: This hypothesis suggests that focused disease management could fail because the disease has already seriously compromised the efficacy of the proposal. The hypotheses does suggest, however, that a program to survey for new carcasses in higher concentration areas on an annual basis, in concert with erecting emergency fences along existing roads, may be an extremely useful management tool to minimize the effects of disease.

These observations emphasize the importance of the Ord-Rodman and Pinto Mountain areas. There is no evidence that either of these regions has been affected with regional die-offs, with the exception of the seven square mile area immediately south of Interstate 40. Their isolation from the larger die-off regions makes them essential to tortoise conservation and recovery in the planning area.

4.7.2.3 Mohave Ground Squirrel

Alternative F relies on MGS conservation in the context of the MGS CA and proactive management on BLM Category I and II habitats and USFWS critical habitat. The original alternative, developed for the tortoise, substitutes conservation of an identified land base with intensive management of common ravens and diseases affecting tortoises. However, it has been carried over as a proposal relative to MGS conservation. Under this alternative there would be no establishment of DWMAs for tortoise conservation, although the MGS CA would be designated for MGS conservation.

Similar impacts given for the tortoise and/or MGS (mostly in Alternative A for the two species) would affect the following programs where the two species ranges coincide: Los Angeles County Significant Ecological Area; Sierra Foothills Habitat Connector; Species-specific Conservation Areas; Compensation and Fee Structure; DWMA Management within the MGS CA; Incidental Take Authorization; 1 % Allowable Ground Disturbance; Multiple Use Class Designations; Habitat Credit Component; Habitat Restoration and Reclamation; Land Acquisition; Mining; Conservation Relative to Military Bases; Commercial Filming and Plant Harvest; Dump Removal and Waste Management; Education; Feral Dog Management Plan; Fire Management; Raven Management Plan; Utilities Construction and Maintenance; Livestock Grazing; Motorized Vehicle Access; Non-competitive Events (Dual Sports); Existing Open Areas and New Recreational Areas; Hunting and Shooting; Competitive Events; Stopping, Parking, and Camping; Surveys (Presence-Absence Surveys, Exploratory Surveys, Surveys for Other Species); Road Maintenance; and Monitoring.

Table 4-62 reports only those benefits and residual impacts as they relate to MGS conservation that are different from the impacts identified under previous alternatives. As such, the programs listed above are not reiterated in the table.

Table 4-62
Mohave Ground Squirrel Impacts of Alternative F

BENEFITS	RESIDUAL IMPACTS
Conservation Area Size of Conservation and Incidental Take Areas • (AF-1) The 2,693 mi^2 MGS CA and pertinent species-specific habitat conservation areas given in Alternative A would benefit MGS conservation.	Conservation Area Size of Conservation and Incidental Take Areas • (AF-1) The two DWMAs would not be established so 823 mi^2 corresponding to that area within the MGS range would not be managed for the tortoise or benefit from that higher level of protection.
Management Structure within the MGS CA 1 % Allowable Ground Disturbance Best Management Practices • (AF-14) BMPs would minimize direct impacts.	Management Structure within the MGS CA 1 % Allowable Ground Disturbance • (AF-5) Failure to apply the 1 percent allowable ground disturbance threshold within the MGS CA would result in unlimited take (on a case-by-case basis), and significantly undermine the efficacy of habitat protection required for the MGS. Best Management Practices • (AF-14) BMPs would not minimize indirect impacts.
Management Structure within the MGS CA HMP Instead of ACEC Designation • (AF-1) The MGS CA would be established as a Wildlife Habitat Management Area, which would marginally benefit the MGS.	Management Structure within the MGS CA HMP Instead of ACEC Designation • (AF-1) Failure to provide for ACEC management and protection would minimize the conservation value of the area, and result in lower spending and implementation priorities.
Management Structure within the MGS CA Category I, II, & III and Critical Habitats for Tortoises • (AF-1) Benefits described above for management in the context of Category I and II habitats and desert tortoise critical habitat would result. • (AF-10) Allowing dogs off leash under the control of their owners in Category I and II tortoise habitat would result in marginal benefits to MGS conservation, as pets are not considered a significant threat to the MGS.	Management Structure within the MGS CA Category I, II, & III and Critical Habitats for Tortoises • Management in the context Category III Habitats would mitigate impacts on a case-by-case basis, provide for less conservation than either Category I and II
Miscellaneous Conservation Programs Law Enforcement • (AF-12) Failure to employ new law enforcement rangers would not substantially detract from MGS conservation, as the MGS does not face many of the threats that adversely affect tortoises.	Miscellaneous Conservation Programs Law Enforcement • (AF-12) Existing law enforcement should be directed more towards habitat protection (i.e., prohibit dumping, cross-country travel outside open areas, etc.), which is not the current focus.
Miscellaneous Conservation Programs Signing and Fencing DWMAs • (AF-15) The fencing program would the same beneficial impacts proposed for Alternative A.	Miscellaneous Conservation Programs Signing and Fencing DWMAs • (AF-15) Failure to fence or sign the DWMA would have the marginal adverse effect of not providing needed education with regards to MGS protection and conservation.

Transportation Highway Fencing and Culverts • (AF-11) Considering CalTrans highway proposals on a case-by-case basis would constitute a marginal beneficial impact.	Transportation Highway Fencing and Culverts

Although the MGS conservation program is similar to that proposed for Alternative A, and the summary comments for that alternative would generally apply to Alternative F as well, the Alternative F program would be less effective due to the focus of tortoise management on disease management and reduction of raven predation rather than the setting aside and protection of habitat. Components of the Alternative A tortoise strategy that would indirectly benefit MGS, such as the designation of tortoise DWMAs as ACECs and the implementation of BMPs for new ground disturbing projects, would not be implemented. Although there would not be increased law enforcement presence, this is not expected to substantially detract from MGS conservation.

4.7.2.4 Bats

Impacts to bats would be as described for Alternative A.

4.7.2.5 Other Mammals

Impacts to other mammals (bighorn sheep, Mojave River vole and yellow-eared pocket mouse) would be as described for Alternative A.

4.7.2.6 Birds

Covered bird species found within the proposed DWMAs of Alternative A receive protection by the development disincentive of the 5:1 mitigation fee amount ratio. They also would benefit by acquisition of private lands, imposition of the utility avoidance measures, and the 1% limit on allowable new ground disturbance. Under Alternative F, the burrowing owl and LeConte's thrasher would lack these conservation measures and be subject to impacts. Other birds found within the proposed DWMAs, including golden eagle and prairie falcon, are located in remote areas and would not necessarily benefit from the DWMA conservation measures. Reduction in the number of ravens may eliminate some competition for nest sites, benefiting the prairie falcon.

Impacts to all other covered bird species would be as described for Alternative A.

4.7.2.7 Reptiles

Impacts to the Panamint alligator lizard, San Diego horned lizard, and Southwestern pond turtle would be as described for Alternative A.

The Alvord Mountain population of the Mojave fringe-toed lizard would lack the conservation benefits provided by the DWMA designation in Alternative A. This includes the development disincentive of the 5:1 mitigation fee amount ratio, acquisition of private lands, and the 1% limit on allowable new ground disturbance. The remote location and lack of threats make this a minor impact in the short term, though this population may be genetically distinct and important to conservation in the long term.

4.7.2.8 Plants

Impacts to the following plants would be as described for Alternative A: alkali mariposa lily, carbonate endemic plants, Charlotte's phacelia, flax-like monardella, Kelso Creek monkeyflower, Kern buckwheat, Mojave tarplant, Parish's alkali grass, Parish's popcorn flower, Red Rock poppy, Red Rock tarplant, Reveal's buckwheat, Salt Springs checkerbloom, Shockley's rock-cress, short-joint beavertail cactus, triple-ribbed milkvetch and white-margined beardtongue.

Covered plant species found within the proposed DWMAs of Alternative A receive protection by the development disincentive of the 5:1 mitigation fee amount ratio. They also would benefit by acquisition of private lands, imposition of the utility avoidance measures, and the 1% limit on allowable new ground disturbance. Under Alternative F, the following plants would lack these conservation measures and be subject to adverse impacts: Barstow woolly sunflower, crucifixion thorn, desert cymopterus and Mojave monkeyflower.

Plant species with designated conservation areas would not be negatively impacted by the lack of the DWMA designation. These include Barstow woolly sunflower, desert cymopterus, Lane Mountain milkvetch, Mojave monkeyflower, and Parish's phacelia. The specific prescriptions applicable to these conservation areas would beneficially impact these species. The very few occurrences of Barstow woolly sunflower and desert cymopterus found outside the conservation areas would receive no special protection on private lands. No adverse impact is expected from Alternative F, despite their rarity, because of the lack of threats in these areas.

Crucifixion Thorn: Crucifixion thorn would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Superior subregion. Because of the remote areas of occurrence of crucifixion thorn, no adverse impacts from Alternative F are expected to this species for the duration of the West Mojave Plan.

Desert Cymopterus: Desert cymopterus would remain protected on public land by the requirement of avoidance and would benefit from route designation in the Kramer and Superior subregions. Because of the remote areas of occurrence of desert cymopterus, no adverse impacts are expected to this species for the duration of the West Mojave Plan.

Little San Bernardino Mountains Gilia: Without a proactive approach to protection of the limited desert wash habitat with the provision of a Special Review Area, gilia populations would be expected to decline over the long term, perhaps to the point where the plant would

become listed as threatened or endangered.

4.7.3 Socio-Economics

4.7.3.1 Livestock Grazing

Impacts would be as described for Alternative G, the No Action Alternative (below).

4.7.3.2 Mineral Development

Few or no habitat protection measures would be placed on mineral operators if the presence-absence surveys show no tortoise sign, an economic advantage compared with Alternative A. The Habitat Conservation Area would be reduced from 2.2 million acres to 1.3 million acres. Instead of 5:1 compensation being applied to DWMA's with ACEC status, it would apply to the HCA and designated tortoise critical habitat of similar size (if evidence of tortoise presence is found). One noteworthy exception would be the Rand Mountain-Fremont Valley area, which would be part of a DWMA under Alternative A but is not designated as critical habitat. Because the proposed withdrawal for the Rand Mountain-Fremont Valley ACEC would apply to both Alternatives (A and F), mineral development would be limited or mineral deposits removed from development through acquisition under the withdrawal. Even without the withdrawal this area would be an MGS conservation area requiring 5:1 compensation, the same as for Alternative A. The compensation ratio for Category III Tortoise Habitat, if not within an HCA, would be 1:1. Presence-absence surveys would be required for the tortoise in all areas unless it is known that tortoises are absent. Mineral development projects under 10 acres would be subject to the 21 mitigation measures for protection of the desert tortoise developed in the existing Small Mining biological opinion.

4.7.4 Cultural Resources

Controlling disease and predation on tortoises is not expected to cause significant impacts to cultural resources. Alternative A's motorized vehicle access network is carried into this alternative so those impacts will be the same as described in Alternative A. Allowance of motorized vehicle speed events on a case-by-case basis will affect cultural resources along or near routes on which these events are permitted. These actions will require full inventory, avoidance measures, or mitigation of impacts to cultural resources in order to comply with law and regulation, which would impact staff workload and budgets.

4.7.5 Cumulative Impacts

Biological Resources: Cumulative impacts of Alternative F to biological resources would most likely be significantly greater than Alternative A because no additional conservation measures would be applied in the Coyote Basin area, Pinto Mountains or Ord Mountains. Without establishment of DWMAs and their conservation measures and disincentives to development, the risk of fragmentation of habitats in the long term is high. Degradation of

public and private lands by edge effects from adjacent development and from isolated development within large habitat blocks is also a likely adverse scenario.

Minerals: Cumulative mineral impacts would be similar to alternative A..

Livestock Grazing: There would be few new cumulative effects. Most cumulative effects have already occurred when the stipulations from the Biological Opinions were implemented in the early 1990's. The new stipulations from the most recent extension may temporarily or permanently reduce livestock numbers or allotments.

4.8 ALTERNATIVE G: NO ACTION

Impacts would be as described for Alternative A, except as discussed below.

4.8.1 Air Quality

The No Action alternative would not result in any changes in current air quality or future trends. Future management actions would be guided by existing management plans, rules and policy that are restrictive on most of the activities that have the potential to emit pollutants on BLM lands. Future activities would be subject to the current air quality rules and emission control requirements. The SIPs all are required to show attainment of the NAAQS. All of the PM_{10} nonattainment areas except for Owens Valley have met requirements to be reclassified by the USEPA to a Maintenance status. Owens Valley is projected to achieve attainment by 2006.

4.8.2 Biological Resources

4.8.2.1 Natural Communities

Adverse impacts of the No Action Alternative to natural communities within the West Mojave Plan fall into three categories:

1. Fragmentation
2. Degradation
3. Substantial loss or modification of rare community types.

Fragmentation is the division of large habitat blocks into smaller units, creating barriers, edge effects, or inholdings with land uses incompatible with conservation. Some projects, such as canals or paved roads, create much larger adverse impacts to the integrity of natural communities than others, such as single-family residences.

The existing large blocks of creosote bush scrub and saltbush communities would be subject to fragmentation over time, particularly in the western and southern parts of the planning area. Large blocks would remain in the central and eastern regions. Without route designation, these blocks are subject to fragmentation by dirt roads and trails over time, although the

magnitude of these impacts is unknown. The mountain foothill vegetation consisting of relatively large blocks of pinyon pine woodland, juniper woodland, Mojave mixed woody scrub and chaparral communities would experience worse fragmentation from rural development on private land. These communities may lose most of their ecological function.

Degradation of the natural communities by recreational use, fire, trash dumping, infrastructure improvements and edge effects from adjacent development is a predicted consequence of the No Action Alternative. Without route designation on public lands and participation of the local jurisdiction in conservation planning, gradual degradation of natural communities would proceed without restraint. Desert washes and playas would be particularly vulnerable.

The rare and unique communities like native grassland, interior live oak woodland, montane meadow and gray pine-oak woodland are the most at risk. Their small size makes the proportional impacts of fragmentation and degradation larger. Existing wetland protection laws would probably adequately protect valuable and limited natural communities like riparian woodland, riparian scrub, alkali seeps and springs and fan palm oases from conversion to urban uses. Rare species within these wetlands could be lost over time without pro-active conservation measures, however.

Certain smaller communities without major threats, such as greasewood scrub, rabbitbrush scrub and some dune communities would continue in a productive state.

Some additional conservation may take place in the future under the No Action Alternative. Large areas of critical habitat will remain and provide a deterrent to development. Compensation lands for projects affecting listed species will continue to add to the conservation land base. Additional compensation land and set-asides may be established from CEQA review of development projects by local jurisdictions. BLM will manage Category 1 desert tortoise habitat in a protective manner. Los Angeles County may substantially expand the SEAs, which would beneficially impact a number of communities in three areas: rare native grassland and wetland communities near the San Andreas Rift Zone; Joshua tree woodland, juniper woodland and pinyon pine woodland in the San Gabriel Mountains foothills ad dense Joshua tree woodland in the western Antelope Valley. The City of Palmdale may establish open space along the San Andreas Rift Zone, which would protect important wetland habitat.

The overall impact of the No Action alternative on natural communities is adverse and significant under CEQA because of the negative effects on rare vegetation types and fragmentation and degradation of large habitat blocks. The West Mojave ecosystem is in need of pro-active conservation and no action is tantamount to neglect.

4.8.2.2 Desert Tortoise

Alternative G, the No Action alternative, would result in no changes to current management. There are still new data and information that could be used by the BLM, USFWS,

CDFG, and private jurisdictions that could help fine-tune current management, and some of these are suggested, but for the most part, there would be no changes. Chapter 3 is the best place Benefits and residual impacts associated with the No Action alternative are suggested in Table 4-63, although Chapter 3 provides far more information.

Table 4-63
Tortoise Impacts of Alternative G

BENEFITS	RESIDUAL IMPACTS
DWMA DESIGNATION AND CONFIGURATION	
Recent and Current Tortoise Occurrence	Recent and Current Tortoise Occurrence **Alternative G does not include the following acreage in a proactively managed conservation area[16]:** • 11,134 mi^2 within the 2002 range • Only part of the range expressly managed for tortoises would be the 40 mi^2 DTNA • 563 mi^2 (100%) of higher density areas • 411 (97%) of observed tortoises • 2,610 mi^2 (100%) of USFWS critical habitat • 1,405 mi^2 of BLM Category I (97%) and 549 mi^2 of Category II (100%) habitats
Land Management in the Absence of DWMAs • BLM management of public lands within the planning area would still be directed by designations of Category I, III, and III, critical habitat, ACEC management plans, and other applicable management plans	Land Management in the Absence of DWMAs • The weakness described in other alternatives with regards to management under the scenarios given to the left would still apply
Land Management Adjacent to Public Lands	Land Management Adjacent to Public Lands • Adjacent land management would still have effects on public lands relative to the following areas: • Fort Irwin expansion area • BLM OHV Open Areas • Urban interface at Barstow, Silver Lakes, Lucerne Valley, and other areas
DESIGNATION AND MANAGEMENT OF EXISTING ACECS	
Size Relative to the Existing Tortoise ACEC • The 40 mi^2 DTNA would continue be proactively managed as a tortoise ACEC • There would be no management conflict with regards to critical habitat inside versus outside DWMAs	Size Relative to the Existing Tortoise ACEC • Critical habitat adverse modification determinations would still apply to public lands, would not apply to private lands, and in either case, would provide very little real protection to tortoises or habitats
BLM ACEC Management • There would be no need to modify ACEC management plans at the DTNA or elsewhere • The BLM would be obligated to implement its ACEC management plan for the Rand Mountains ACEC, and in the meantime continue to curtail uses (particularly by vehicles) in the ACEC	BLM ACEC Management • The BLM has not fully implemented the ACEC management plan for the Rand ACEC, which continues to be degraded by OHV impacts
BLM Management of Category I, II, & III Habitat • BLM Category I & II habitat management goals would continue to provide direction to maintain and/or increase	BLM Management of Category I, II, & III Habitat • Management goals provide direction, but little other pragmatic protection of tortoises in designated areas

[16] The acreages given above exclude the 40 mi^2 managed for tortoises at the DTNA.

BENEFITS	RESIDUAL IMPACTS
stable and viable populations; this would include relatively higher compensation rates associated with the MOG formula, but little else • BLM would also be directed to limit declines through mitigation in Category III	
Plan Implementation • Not applicable, as there would be no plan to implement	Plan Implementation
Federal Permitting • Federal permitting would continue under Sections 10 and 7 of FESA and have the advantages and disadvantages described under previous alternatives; Section 7 would continue to function to minimize direct impacts, although it would have little effect on indirect impacts that result	Federal Permitting • Significant problems with permitting under Section 10 would be perpetuated
State Permitting • State permitting would continue under Section 2081 for private developers and 2090 for State lead agencies (i.e., Caltrans, water districts, etc.)	State Permitting • Significant problems with permitting under Section 2081 would be perpetuated
Compensation & Fee Structure • Compensation would continue under the MOG formula as described above and be commensurate with the level of impact	Compensation & Fee Structure
MAINTAINING CURRENT MULTIPLE USE CLASSES	
Class L and C • Class L lands would continue to be managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished; Class C would be even more protective	Class M, and I, and Unclassified • Class M and I lands, and unclassified lands, would continue to be managed under guidelines that allow for uses that would be incompatible (i.e., Class I) or minimally protective (i.e., Class M) for tortoises; overall, very little protection would be provided except in Class L and C
ACEC Prescriptions Supercede Class M • Not applicable, as no changes would result	ACEC Prescriptions Supercede Class M • Not Applicable
1% ALLOWABLE GROUND DISTURBANCE	
Function to Minimize Impacts • Not applicable, as no changes would result	Function to Minimize Impacts • Not applicable, as no changes would result
PRIVATE LAND ACQUISITION AND PUBLIC LAND DISPOSAL	
Acquisition Priorities • Provides data that would allow BLM to acquire private lands that would most likely alleviate observable human impacts and promote conservation	Acquisition Priorities
BLM Land Tenure Adjustment (LTA) • LTA program would continue to result in retention and consolidation of important tortoise habitats	BLM Land Tenure Adjustment (LTA) • Public lands, in the absence of a designated conservation area, would be vulnerable to extremely large projects (i.e., Venture Star, Fort Irwin Expansion, etc.), without the benefit of new regulations or prohibitions against public land disposal in areas designated for conservation

BENEFITS	RESIDUAL IMPACTS
Motorized Vehicle Access • The BLM has been obligated since 1980 to complete route designation, which would still be required under this alternative. This is a highly beneficial impact even if routes are not closed where they would best benefit tortoise conservation	Motorized Vehicle Access
NEW AGRICULTURAL DEVELOPMENT	
• Same as Alternative A	• Same as Alternative A
COMMERCIAL FILMING ACTIVITIES	
• Given the new information, BLM could still modify its management in higher density areas and other places to facilitate current management, which already appears to be working to minimize. However, there is no guarantee that this would happen under this alternative	• No action alternative fails to provide for a higher level of management on private lands
CONSTRUCTION ACTIVITIES	
• Construction, fee compensation, surveys, etc. would continue to be authorized under the context of Section 7 and other regulatory management that more or less provides for protection	• Guidelines and regulatory requirements implied to the left would allow for habitat fragmentation (i.e., wind and solar energy development, new county roads, etc.), mining, utilities construction, etc. that will continue to slowly degrade tortoise habitats, even if direct impacts are adequately minimized and mitigated • Since BLM's management is necessarily restricted to public lands, the adverse impacts associated with development on private lands would continue in an unabated manner and perpetuate serious inconsistent problems and impacts • Would fail to provide for consistent standards implemented across multiple jurisdictions, which would perpetuate problems
DISEASE MANAGEMENT	
• Disease management would continue in the context of direction from the MOG, DMG, and upper level management entities, which would likely be sufficient to ensure that "break through" technologies are implemented	• Funding, research, and other factors that may lead to expeditious handling of disease would not be available under current management

BENEFITS	RESIDUAL IMPACTS
DROUGHT	
Motorized Vehicle Access • BLM would still be obligated to implement a designated route network, which is the single most effective measure to alleviate human impacts during time of drought, particularly to minimize vehicle use in and alongside washes. As such, there would still be the closure of 117 of 177 linear miles (66%) of routes identified as occurring within washes in DWMAs. There are certainly more than 177 linear miles of washes in DWMAs, however, since route use would be restricted to only those routes that are designated as open, washes that are not included would not be available for vehicle use, which would be a very significant beneficial impact. • Route reductions in higher density tortoise areas in DWMAs would serve to alleviate human-induced stresses during drought periods	Motorized Vehicle Access • Alternative would fail to close 60 linear miles (34%) of roads in DWMAs that coincide with washes
EDUCATION PROGRAM	
• It is likely that existing education programs would be augmented in light of new data and information that has come to light during plan preparation. The extent of this augmentation is unknown, and therefore cannot be analyzed	
ENERGY AND MINERAL DEVELOPMENT	
New Development • Mining would continue in the context of existing biological opinions regulating sites smaller than 10 acres • Under its multiple use context, and in the absence of establishing conservation areas, large mines would be permitted, and impacts minimized and mitigated on a case-by-case basis. The significance of this impact would be related to the size, frequency, and distribution of new, larger mines, which cannot be analyzed, as no foreseeable larger mines are known at this time	New and Existing Development • Does not adequately address how existing and new contamination associated with mining activities would be remedied and avoided • There is no indication how impacts associated with new haul roads would be minimized or avoided
New Exploration • New exploration would still be regulated by BLM-approved Plans of Operation, which for the most part, serve to minimize this type of	New Exploration
Habitat Credit Component • Not applicable	Habitat Credit Component • Not applicable
FERAL DOG MANAGEMENT	
	• There would be no Feral Dog Management Plan, which would fail to address this serious impact that will become more serious with time

BENEFITS	RESIDUAL IMPACTS
FIRE MANAGEMENT	
• Existing programs would continue to be implemented on public lands with the intent of minimizing fire fighting impacts • New data and information are now available that would help the BLM minimize impacts of fire fighting activities, although it is not known if this information would be proactively used	
CATTLE GRAZING ON BLM ALLOTMENTS	
• Beneficial impacts associated with current management of cattle grazing are minimal, and have been discussed in other alternatives	• Impacts associated with current management of cattle grazing are multiple, and have been discussed in other alternatives
SHEEP GRAZING ON BLM ALLOTMENTS	
• Beneficial impacts associated with current management of sheep grazing are minimal, and have been discussed in other alternatives	• Impacts associated with current management of sheep grazing are multiple, and have been discussed in other alternatives
GUZZLERS	
• Not applicable; see Alternative B	• Not applicable; see Alternative B
HABITAT CREDIT COMPONENT	
• Not applicable, as this program would not be established	• Not applicable, as this program would not be established
HEAD STARTING PROGRAM	
• Not applicable, as this program would not be established	• Not applicable, as this program would not be established
LAW ENFORCEMENT	
• Same as Alternative B	• Same as Alternative B
MOTORIZED VEHICLE ACCESS NETWORK	
Overall Importance • Designating and implementing a motorized vehicle access network in DWMAs that is supported by land use laws and compatible with tortoise recovery is the single most important management action that could be implemented to minimize the widest variety of known human impacts. The BLM is obligated by the CDCA Plan to identify and implement this network in the absence of the WMP, which is significant beneficial impact • See Alternative A and B for beneficial impacts	Overall Importance • See Alternative A and B for impacts
PLANT HARVEST	
• Same as Alternative B	• Same as Alternative B

BENEFITS	RESIDUAL IMPACTS
RAVEN MANAGEMENT	
Coordination and Participation • There would be no proactive raven management plan. However, the USFWS was recently tasked by the DMG to take a proactive role in raven management. If this occurs, one may expect to see more proactive programs identified in future USFWS biological opinions, which would positively affect BLM's management where it serves as the Federal Lead Agency for the authorized project	Coordination and Participation • Without a focused plan, there are likely to be minimal proactive measures to address raven predation, which would be expected to occur as at present. This would likely be more significant on private lands than on public lands, given the nature of private land development (i.e., residential
RECREATION ACTIVITIES	
• The many small nuances associated with beneficial impacts of this alternative are captured in other alternatives, and not reiterated here	• The many small nuances associated with impacts of this alternative are captured in other alternatives, and not reiterated here
TRANSPORTATION	
• There are few beneficial impacts associated with no action; the few that may occur are given in other alternatives, and not reiterated here	• There are numerous impacts associated with no action; the many that may occur are given in other alternatives, and not reiterated here
UTILITIES	
• There are few beneficial impacts associated with no action; the few that may occur are given in other alternatives, and not reiterated here	• There are numerous impacts associated with no action; the many that may occur are given in other alternatives, and not reiterated here
WEED CONTROL	
• Not applicable, as this program would not be implemented	• Not applicable, as this program would not be implemented

Chapter 3 is the best place to see problems associated with current management that would be perpetuated under the No Action alternative. Perhaps most significant is the failure to establish a conservation land base in the form of DWMAs, the pros and cons of which are best elucidated in the analyses of Alternatives E and F. Although there are sometimes serious problems associated with public land management as it relates to tortoise conservation and recovery (i.e., livestock grazing, wind energy development, disposal of public lands for large-scale development, lack of raven and disease management, etc.), the Section 7 consultation process has worked relatively well to minimize direct impacts; indirect impacts are still problematic and would not be addressed without proactive conservation measures described in Alternative A and elsewhere. The more serious impacts are with regards to private land development and other issues, which would also be perpetuated under this alternative. Again, these are best elucidated in Chapter 3 and in Alternatives B, E, and F.

4.8.2.3 Mohave Ground Squirrel

Alternative G, the No Action Alternative, would result in no new management prescriptions, DWMAs, or MGS CA establishment. There are very few beneficial impacts associated with current management; those that occur are listed above, particularly under MGS Alternative B.

The majority of the impacts would be adverse, and many of them significant. The *impacts* identified for the following programs are iterated throughout all previous alternatives, and are not reiterated herein: Los Angeles County Significant Ecological Area; Sierra Foothills Habitat Connector; Species-specific Conservation Areas; 1 % Allowable Ground Disturbance; HMP Instead of ACEC Designation; Multiple Use Class Designations; Conservation Relative to Military Bases; Commercial Filming and Plant Harvest; Dump Removal and Waste Management; Education; Feral Dog Management Plan; Fire Management; Habitat Credit Component; Habitat Reclamation and Restoration; Land Acquisition; Law Enforcement; Mining; Raven Management Plan; Signing and Fencing DWMAs; Utilities Construction and Maintenance; Livestock Grazing; Motorized Vehicle Access; Competitive Events; Non-competitive Events (Dual Sports); Hunting and Shooting; Stopping, Parking, and Camping; Surveys (Presence-Absence Surveys, Exploratory Surveys, Surveys for Other Species); Highway Fencing and Culverts; Road Maintenance; and Monitoring

Table 4-64 reports only those benefits and residual impacts as they relate to MGS conservation that are different from the impacts identified under previous alternatives.

Table 4-64
Mohave Ground Squirrel Impacts of Alternative G

BENEFITS	RESIDUAL IMPACTS
Conservation Area Size of Conservation and Incidental Take Areas • Management within the DTNA would continue to benefit MGS conservation.	Conservation Area Size of Conservation and Incidental Take Areas • Failure to designate new conservation areas for the MGS would likely result in habitat fragmentation, which could significantly impact the MGS and its habitats. Continued management by cities and counties under existing general plans would have minimal benefit to the species.

BENEFITS	RESIDUAL IMPACTS
Management Structure within the MGS CA DWMA Management within the MGS CA	Management Structure within the MGS CA DWMA Management within the MGS CA • Failure to provide specific, new conservation measures for the MGS, and relying on the DTNA as the only proactively managed place outside military bases for MGS conservation, would constitute a significant impact. • No new measures would be identified relative to MGS conservation. Management would continue to be applied on private lands, but would not significantly affect management on public lands, except as provided for under CDCA guidelines and an MOU established between the BLM and CDFG. Significant impacts are likely to result from such an approach. Incidental Take Authorization • Incidental take authorization under Section 2081 would continue to be sought on private lands regardless of the presence or absence of the species. Compensation would continue in a variable manner and fail to provide for regional conservation. These and other factors would perpetuate existing problems and constitute a significant impact. Compensation and Fee Structure • Continuing to implement the MOG formula would mostly apply to tortoises on public lands, although it is also applied to private lands based on their proximity. As such, the MOG formula would only apply to MGS where the two species coincide. Therefore, problems with regional minimization and mitigation of impacts to the MGS would be perpetuated and constitute a significant impact.
Management Structure within the MGS CA Category I, II, & III and Critical Habitats for Tortoises • Management in the context of tortoise habitat categories, critical habitat, and protection provided by CESA on private lands would continue to provide for limited, marginal protection.	Management Structure within the MGS CA Category I, II, & III and Critical Habitats for Tortoises

The No Action Alternative would result in significant impacts due to its failure to alleviate habitat loss and degradation throughout the MGS range. The best opportunity to conserve habitat is on public lands managed by the BLM, where 2,478 mi^2 occur within the range. These lands are more likely to be degraded through authorized uses (i.e., grazing and vehicle recreation); except for transfer of public lands to private ownership, the outright loss of habitat is less likely. The loss (and degradation) of habitat is most likely to occur on private lands. Although individual MGS may tolerate habitat degradation, as evidenced by anecdotal observations in urbanizing areas, there is no evidence to suggest that the species can occupy bladed areas, agricultural areas, and lands that are physically covered by asphalt and concrete.

Region-wide trapping surveys in 2002 suggest that the MGS may be more common north of Highway 58 than to the south (Phil Leitner, 2002 memo), although this is speculation. The success of MGS conservation may always be in question, given the squirrel's biology to go through "boom and bust" cycles described in Chapter 3. Whereas increasing numbers and stable populations provide a measure of the success of tortoise conservation, the success of conserving the MGS would necessarily be measured by the amount and quality of habitat within the range. It is apparent that the MGS would disappear from suitable habitats in one year, only to be found there in the future.

4.8.2.4 Bats

The No Action alternative would perpetuate the existing situation for bats, which are relatively unknown and commonly ignored in environmentally reviews. Though larger mining projects that could impact bats would receive adequate review by local and federal jurisdictions, small sites (bridges, tunnels, old buildings) that may harbor significant roosts could be lost without knowing.

The known significant roosts on public lands (BLM and NPS) would probably remain intact, but would be at risk from human disturbance. The extreme sensitivity of these sites during the maternity or hibernation periods makes this risk biologically unacceptable.

4.8.2.5 Other Mammals

4.8.2.5.1 Bighorn Sheep

Because bighorn are primarily a wilderness species within the West Mojave, impacts are not anticipated to be adverse or significant, especially in the short term. In the long term, potential dispersal corridors could be lost to development or construction of barriers.

4.8.2.5.2 Mojave River Vole

As long as groundwater sufficient to support riparian habitat in the Mojave River between Victorville and Helendale is maintained, habitat will remain for the Mojave River vole. Existing wetland laws should suffice to protect the surface conditions, and no adverse impacts are anticipated. If the Mojave Basin Adjudication is not sufficient to stop the overdraft and restore groundwater to the Mojave River, drying of the surface would cause the habitat to shrink to areas where permanent water is present, as at the upper and lower Mojave Narrows. The contraction in range for this narrow endemic species would be very adverse and significant and could lead to its listing as a threatened or endangered species.

4.8.2.5.3 Yellow-eared Pocket Mouse

Threats to yellow-eared pocket mouse are few, and information about its numbers and precise distribution is inadequate to accurately predict the future. Effects of grazing are not known. Most known sites within the known range are protected as wilderness or ACECs. Even with no action, few adverse impacts are expected to this species overall. The southern portion of the range in the Kelso Valley is subject to fragmentation by rural development in the long term.

4.8.2.6 Birds

4.8.2.6.1 Bendire's Thrasher

Without a program of additional surveys, the causes of the apparent decline of this species in the West Mojave would remain unknown. Off-site mitigation for expansion of training at Fort Irwin (if approved) would increase public land ownership of occupied habitat on Coolgardie Mesa. Without route designation, an adverse effect on this vehicle-sensitive bird is expected. No apparent threats exist in the Kelso Valley habitat.

4.8.2.6.2 Brown-crested Flycatcher

Existing BLM management at Big Morongo Canyon ACEC would conserve brown-crested flycatcher at that location. Occurrences at Mojave Narrows Regional Park are also well protected. In the remainder of the Mojave River between Victorville and Helendale, existing wetland laws would serve to conserve the riparian habitat. The Mojave Basin Adjudication, if enforced, would maintain groundwater levels sufficient to support the occupied habitat. If groundwater levels are not maintained, the riparian habitat would slowly decline, leading to a decline in the numbers and occupied acreage of habitat for this neotropical migrant.

4.8.2.6.3 Burrowing Owl

The No Action Alternative would continue the haphazard system of defining impacts and mitigation for burrowing owl, which is most often located at urban or suburban development sites. A gradual decline in the numbers of this species is expected. This impact is not adverse or significant to the species as a whole, which occupied grassland habitats in the Great Plains and agricultural habitats in the Central Valley and Imperial Valley of California.

Alternative G would provide no benefit of route designation to the burrowing owl, which can be easily disturbed by vehicles near nest sites. Taking no action would perpetuate the risk of disturbance and loss of nest sites throughout the lower elevations of the West Mojave.

4.8.2.6.4 Ferruginous Hawk

No action would continue the practice of permitting unsafe electrical distribution lines in some locations, which could include important wintering areas for ferruginous hawk. The continuing electrocution of these large birds is expected, thought the number of hawks affected is unknown. BLM will require raptor-safe power lines on its lines for new rights-of-way. Without a program of monitoring to detect problem poles, no opportunity to retrofit and correct the problem would exist, apart from the voluntary (and largely successful) efforts of utilities such as Southern California Edison Company, that engage in this effort.

4.8.2.6.5 Golden Eagle

No action would continue the practice of permitting unsafe electrical distribution lines in some locations, which could include important wintering areas and some nesting sites for golden eagle. The continuing electrocution of these large birds is expected, thought the number affected is unknown. BLM will require raptor-safe power lines on its lines for new rights-of-way. Without a program of monitoring to detect problem poles, no opportunity to retrofit and correct the problem would exist, apart from the voluntary (and largely successful) efforts of utilities such as Southern California Edison Company, that engage in this effort.

A few golden eagle nest sites would remain vulnerable to vehicle disturbance during the nesting season with the No Action Alternative. Future increased recreational use of remote mountainous areas might increase the potential for disturbance to nest sites. This would constitute a small adverse impact to this raptor.

4.8.2.6.6 Gray Vireo

Without designation of the conservation area at Big Rock Creek or the revised SEA boundaries for the Antelope Valley, the gray vireo would gradually decline in numbers and acreage of occupied habitat. This is because of an expected continuation of rural development in the foothills of the San Gabriel Mountains. The bird would probably persist within the Angeles and San Bernardino National Forests, and in Joshua Tree National Park and the Juniper Flats ACEC. Other lands with high potential for gray vireo, such as the Bighorn and San Gorgonio Wilderness areas would remain in conservation status. Hence, although the gray vireo might undergo substantial declines, it would not become extirpated from southern California.

4.8.2.6.7 Inyo California Towhee

The BLM would continue to remove feral burros from the Argus Range, eliminating the primary threat to the habitat of the Inyo California towhee. No eradication of exotic species from springs utilized by the birds would take place, which could lead to a gradual reduction in the occupied habitat. The opportunity to delist the species by undertaking pro-active conservation actions would be lost.

4.8.2.6.8 LeConte's thrasher

The range and occupied habitat for LeConte's thrasher would continue to become fragmented without positive steps to establish large, contiguous habitat blocks. Within the Plan's time frame, populations of this bird would be expected to decline at the fringes of urban centers. Without a route network for public lands, disturbance to LeConte's thrasher in the nesting season would continue, and probably increase. It is unlikely that numbers would decrease to the point of qualifying for listing as threatened or endangered, but the No Action Alternative would be adverse to this species.

4.8.2.6.9 Long-eared Owl

Without pro-active conservation measures, important roost and nest sites for long-eared owl would be addressed on a case-by-case basis. Existing wetland laws would protect those riparian sites, but other woodland sites might be lost.

4.8.2.6.10 Prairie Falcon

The No Action Alternative would probably have no adverse affect on the overall number of prairie falcons in the West Mojave. Loss of a few occupied territories is expected. Most nest sites are in rugged terrain, often in designated Wilderness, and existing threats to the prairie falcon are minimal.

4.8.2.6.11 Southwestern Willow Flycatcher

Existing occupied habitat at Mojave Narrows, suitable nesting habitat at Big Morongo Canyon and migration habitat in the east Sierra canyons would continue to support resident and migratory populations of the willow flycatcher. However, the opportunity for expansion and recovery of this species in the Mojave River would be lost without measures to maintain groundwater levels at the minimum necessary to support the riparian habitat.

4.8.2.6.12 Summer tanager

Existing BLM management at Big Morongo Canyon ACEC would conserve summer tanager at that location. Occurrences at Mojave Narrows Regional Park are also well protected. In the remainder of the Mojave River between Victorville and Helendale, existing wetland laws would serve to conserve the riparian habitat. The Mojave Basin Adjudication, if enforced, would maintain groundwater levels sufficient to support the occupied habitat. If groundwater levels are not maintained, the riparian habitat would slowly decline, leading to a decline in the numbers and occupied acreage of habitat for this neotropical migrant. This loss would not be significant to the species as a whole, but would remove one of the larger breeding populations in the state.

4.8.2.6.13 Vermilion flycatcher

Existing BLM management at Big Morongo Canyon ACEC would conserve vermilion flycatcher at that location. Occurrences at Mojave Narrows Regional Park are also well protected. In the remainder of the Mojave River between Victorville and Helendale, existing wetland laws would serve to conserve the riparian habitat. The Mojave Basin Adjudication, if enforced, would maintain groundwater levels sufficient to support the occupied habitat. If groundwater levels are not maintained, the riparian habitat would slowly decline, leading to a decline in the numbers and occupied acreage of habitat for this neotropical migrant. This loss would not be significant to the species as a whole, but would remove one of the larger breeding populations in the state.

4.8.2.6.14 Western Snowy Plover

The Western snowy plover is very site-specific in nesting habitat requirements. Ongoing efforts at conservation would continue at Searles Lake and Harper Dry Lake, but other potential locations, especially on private lands, would probably go undetected. Adverse impacts may take place without anyone knowing. The No Action Alternative would most likely result in increased recreation on and adjacent to playas supporting potential or undetected nest sites, resulting in a moderate adverse impact to the species.

To the species as a whole, loss of the West Mojave locations would represent an incremental loss, rather than a major cause of decline. The coastal and Mississippi River populations are now listed as threatened and endangered, and the status of the remaining populations is unclear. Because the population size is believed to be very small in the West Mojave planning area, any loss of nest sites is a significant impact.

4.8.2.6.15 Western Yellow-billed Cuckoo

Because no nesting yellow-billed cuckoos are found within the Plan area at present, the No Action alternative would present no adverse impacts on the species. However, an opportunity to restore and maintain riparian habitat and allow for the recovery of this bird would be lost.

4.8.2.6.16 Yellow-breasted Chat

Existing BLM management at Big Morongo Canyon ACEC, Whitewater Canyon ACEC, and the east Sierra canyons would conserve yellow-breasted chat at publicly owned locations. Occurrences at Mojave Narrows Regional Park are also well protected. In the remainder of the Mojave River between Victorville and Helendale, existing wetland laws would serve to conserve the riparian habitat. The Mojave Basin Adjudication, if enforced, would maintain groundwater levels sufficient to support the occupied habitat. If groundwater levels are not maintained, the riparian habitat would slowly decline, leading to a decline in the numbers and occupied acreage of habitat for this species. This loss would not be significant to the species as a whole.

4.8.2.6.17 Yellow Warbler

Existing BLM management at Big Morongo Canyon ACEC, Whitewater Canyon ACEC, and the east Sierra canyons would conserve yellow warbler at publicly owned locations. Occurrences at Mojave Narrows Regional Park are also well protected. In the remainder of the Mojave River between Victorville and Helendale, existing wetland laws would serve to conserve the riparian habitat. The Mojave Basin Adjudication, if enforced, would maintain groundwater levels sufficient to support the occupied habitat. If groundwater levels are not maintained, the riparian habitat would slowly decline, leading to a decline in the numbers and occupied acreage of habitat for this neotropical migrant. This loss would not be significant to the species as a whole.

4.8.2.7 Reptiles

4.8.2.7.1 Mojave Fringe-toed Lizard

Because conservation of the fringe-toed lizard depends on protection of ecosystem processes, the No Action Alternative would ultimately lead to the elimination of one or more of the occupied habitats in the West Mojave. The population at Saddleback Butte State Park would likely be extirpated. The discontinuous occurrences along the Mojave River east of Barstow would become increasingly fragmented, and might not survive in the long term. The occurrences at the Alvord slope and adjacent to Dale Lake would probably remain in the long term, but the habitat on the west slope of Alvord Mountain would continue to receive adverse impacts from the proliferation of existing routes.

Suitable habitat at El Mirage and northeast of Harper Lake would continue to receive a moderate level of adverse impacts from vehicle disturbance. The effect on the fringe-toed lizards (if any) at these locations is unknown.

Habitat at Pisgah Crater would become more degraded by surface disturbance in the long term. Route proliferation is evident in this area within the occupied and suitable habitat. Fringe-toed lizards at Manix and Cronese Lakes ACEC would continue to be conserved.

The Mojave fringe-toed lizard is not seriously threatened throughout its range. Outside the West Mojave thirteen additional locations support this species, and threats at these sites are minimal. Some are protected within the Mojave National Preserve and Death Valley National Park. However, this species survives in distinct isolated populations. Some evidence exists for genetic differentiation among the populations at Alvord Mountain, Dale Lake and Pisgah Crater, so loss of any one of these populations could represent a substantial loss of genetic diversity within the species.

4.8.2.7.2 Panamint Alligator Lizard

The lack of current or anticipated future threats to the isolated springs in the Argus Range and the continuing removal of burros by the Navy and BLM would mean that the No Action Alternative would have no adverse affect on the Panamint alligator lizard in the West Mojave. No eradication of exotic species from springs utilized by the Inyo California towhee that are suitable habitat for the Panamint alligator lizard would take place. Because the Panamint alligator lizard is apparently not dependent on specific vegetation, no adverse impact is anticipated.

4.8.2.7.3 San Diego Horned Lizard

About half of the range of the San Diego horned lizard in the West Mojave could be lost from long-term fragmentation of the habitat by rural and some suburban development in the San Gabriel and San Bernardino Mountains foothills. This adverse impact would not affect the viability of the species overall, since the major portion of its range is on the coastal slope of the Transverse Ranges. Conservation efforts throughout the range of the San Diego horned lizard, particularly the Natural Community Conservation Plans in San Diego, Orange, and Riverside counties are expected to result in the prevention of this lizard from becoming listed as threatened or endangered in the future or becoming extinct.

Protected habitat blocks would be conserved in the carbonate endemics area, the Juniper Flats ACEC, the Bighorn Wilderness, and the San Gorgonio Wilderness. Failure to perform additional route designation in the Juniper and Bighorn subregions would be somewhat adverse to the horned lizard compared to Alternative A.

4.8.2.7.4 Southwestern Pond Turtle

Although primarily a species of the coastal side of the Peninsular and Coast Ranges, the Mojave Desert occurrences of the southwestern pond turtle are of high interest. The No Action Alternative would allow for their continued occupation of Afton Canyon and Camp Cady, assuming that BLM and CDFG maintain the existing management, which includes tamarisk removal and protection of the riparian and surface water habitat. Maintenance of the groundwater in the Mojave River would remain the responsibility of the parties affected by the adjudication.

In the San Andreas Rift Zone, conservation of the pond turtles would depend on the effectiveness of existing wetland protection regulations in maintaining habitat. Urban encroachment on this habitat would probably continue, leading to a decline and possible extirpation of the pond turtles west of Palmdale.

4.8.2.8 Plants

4.8.2.8.1 Alkali Mariposa Lily

The No Action alternative would not impact Edwards AFB, where the vast majority of alkali mariposa lily plants are located. Continued development of the edges of the Rosamond Lake playa outside the base boundaries in Lancaster, Los Angeles and Kern counties, would reduce the numbers and range of the species. The occurrences at isolated springs and seeps are likely to remain unaffected. Hence, while the species overall would not be at risk of extinction, its continued survival would depend on military protection and on conservation of the few locations outside the West Mojave, such as the Kern River Valley.

4.8.2.8.2 Barstow Woolly Sunflower

Although specific threats to the Barstow woolly sunflower are few, the fragmentation of its habitat by scattered development and widespread off-highway travel is a long-term problem. Without the ACEC designation and some specific management on private, state and federal lands, this plant is likely to decline in numbers. It could become listed as threatened or endangered in the future.

4.8.2.8.3 Carbonate Endemic Plants

Mining has been the primary cause of loss of the carbonate endemic plant species in the past, and the large limestone mines are located primarily on Forest Service lands just south of the West Mojave boundary. Because the carbonate deposits are more economically developed outside the planning area, the No Action Alternative would not substantially reduce the numbers or restrict the range of the four carbonate-endemic species within the CDCA.

Completion of the Carbonate Habitat Management Strategy is assumed to be part of the No Action Alternative. This document would become agency guidance for federal actions on these species and receive a separate Biological Opinion. San Bernardino County would adopt the measures outlined in the CHMS as mitigation guidelines for County discretionary approvals. Under this scenario, mining impacts to the carbonate endemic plant species would not be significant and would be mitigated.

The CHMS does not address route designation within the carbonate habitat. Without additional management of travel on the existing routes that traverse critical habitat, adverse modification to the critical habitat is more likely. In addition, specific management of grazing where the Rattlesnake Canyon allotment overlaps with occurrences of Parish's daisy is necessary to prevent the long-term loss of these occupied habitats.

4.8.2.8.4 Charlotte's Phacelia

Lack of threats to Charlotte's phacelia make impacts of the No Action Alternative the same as Alternative A, except that without monitoring of the occurrences in the east Sierra canyons, the ability to detect declines is lost.

4.8.2.8.5 Crucifixion Thorn

Because threats to crucifixion thorn are few and nearly all known occurrences within the West Mojave are on public lands, the numbers and habitat for this species are expected to remain stable under the No Action Alternative. Alternative G is less desirable than Alternative A due to the retention of unnecessary routes crossing habitat near Pisgah Crater.

4.8.2.8.6 Desert Cymopterus

Positive conservation action is needed to prevent declines of desert cymopterus on public and private land within the West Mojave outside Edwards AFB. Without consolidation of existing routes in the Fremont, and Superior subregions into a network based on avoidance of this species, habitat and numbers of desert cymopterus would be impacted in the future. The No Action Alternative would not address other potential threats, including grazing and private land development in occupied habitat.

Lack of a rangewide plan for this narrow endemic plant could lead to its listing as threatened or endangered within the term of the Plan.

4.8.2.8.7 Flax-like Monardella

No substantial impacts are expected to the flax-like monardella from the No Action Alternative because of the light use of the Middle Knob area and remote location of known occurrences. Newly detected occurrences on Middle Knob could be at risk without ACEC designation and avoidance standards, depending on their location.

4.8.2.8.8 Kelso Creek Monkeyflower

Threats are not apparent to Kelso Creek monkeyflower on public lands, but this narrow-range plant is vulnerable to even small land-use changes, such as increased grazing, increased use of dirt roads and trails, or construction of new wind turbines. Spillover impacts onto public land from adjacent rural development on private land may be the most likely source of new habitat impacts, since the plant is found on the boundary of pubic and private lands in many places. The No Action Alternative would lead to loss of habitat and small numbers of this species in the long term, which would be significant given the extremely limited range of the species

4.8.2.8.9 Kern Buckwheat

Small areas of existing populations of Kern buckwheat are being impacted by vehicle and trail use near Sweet Ridge in the Middle Knob area. Without restoration efforts, the numbers of this extremely restricted West Mojave endemic plant would continue to decline. In addition, off-road intrusion onto the clay soil habitat has damaged one significant population and this could continue without placement of rock or bollard barriers at the edge of the open route. The No Action Alternative would lead to eventual loss of numbers and area of habitat for this species. This species currently meets the definition of rare under state law. Without positive conservation measures, Kern buckwheat could become listed as threatened or endangered in the future.

4.8.2.8.10 Lane Mountain Milkvetch

The primary potential threat to individuals and habitat of Lane Mountain milkvetch is the operations that might take place on the Fort Irwin expansion lands. The Army has proposed mitigation for impacts on this species, which is incorporated into the Biological Opinion from the USFWS. Mitigation measures would take place on private and public lands outside the expansion area in the Superior Valley and on the Coolgardie Mesa. These measures would benefit the species by consolidating the public ownership of the occupied habitat.

The BLM would address potential impacts on the Lane Mountain milkvetch on public lands outside the Fort Irwin expansion area on a case-by-case basis, and would request a Biological Opinion from the Fish and Wildlife Service. Because of the very limited numbers and range of this plant, it is unlikely that any substantial ground-disturbing activities that might affect Lane Mountain milkvetch would be allowed. However, impacts from recreational activities, including off-highway vehicle travel and casual use mining, would continue. These activities degrade the habitat and could result in the loss of plants. Without route designation, signing, enforcement and potentially fencing of certain areas, the Lane Mountain milkvetch is likely to decline substantially outside the military lands. This is a significant biological impact.

On private lands, San Bernardino County would consider impacts of any discretionary action on a case-by-case basis. Land use changes near Lane Mountain and on Coolgardie Mesa are anticipated to be minimal, though the loss of even a few plants or acres for this endangered species is significant.

4.8.2.8.11 Little San Bernardino Mountains Gilia

As a local endemic restricted to a small area in the western Coachella Valley and the Joshua Tree areas, the Little San Bernardino Mountains gilia is vulnerable to habitat fragmentation and modification of the desert washes where it occurs. Without a proactive approach to protection of the limited desert wash habitat, gilia populations would be expected to decline over the long term, perhaps to the point where the plant would become listed as threatened or endangered.

A small likelihood of negative impact to potential habitat would occur without route designation in the Copper Mountain MAZ.

4.8.2.8.12 Mojave Monkeyflower

The No Action Alternative would probably have negative effects on the Mojave monkeyflower because this species is vulnerable to habitat fragmentation. Continued approval of projects on a case-by-case basis could prevent establishment of a contiguous habitat for Mojave monkeyflower. It is likely that this species would eventually be proposed for listing as threatened or endangered. The Brisbane Valley portion of the range would become increasingly fragmented as BLM lands are exchanged under the Land Tenure Adjustment Program, but the plants would probably persist in the Daggett Ridge area and the Newberry Mountains.

The No Action Alternative would be adverse compared to Alternative A in the Dagget Ridge and Azucar mine areas, where the existing network of redundant routes and routes in washes would continue to cause small harmful impacts to known populations and suitable habitat. Without an education and enforcement program, route proliferation and off road travel would be more likely in the Brisbane Valley as well, potentially damaging occupied habitat on public lands.

4.8.2.8.13 Mojave Tarplant

Lack of threats to Mojave tarplant make impacts of the No Action Alternative the same as Alternative A, except that without monitoring, the ability to detect declines is lost. Newly-detected occurrences would be conserved or developed on a case-by-case basis.

4.8.2.8.14 Parish's Alkali Grass

Acquisition of the only site for Parish's alkali grass would not be prescribed, and no conservation assurances for this species could be made. San Bernardino County would consider protection on a site-specific basis if the owners applied for a discretionary permit for land use changes. Existing wetland laws would probably result in conservation of most but not all, of the occupied habitat

4.8.2.8.15 Parish's Phacelia

Protection of Parish's phacelia would continue to be evaluated on a case-by-case basis at the time projects are considered in this area. These would primarily be utility installations and maintenance activities. BLM would impose stipulations requiring soil salvage and respreading, avoidance to the maximum extent feasible, and construction monitoring. No acquisition of the small playas and surrounding lands would take place, so that conservation of entire local range of this species could not be assured. Because development pressure on private land is very low in this area, no adverse impacts to Parish's phacelia are anticipated.

Unregulated travel on the small playas is a potential threat of fairly high risk. Such travel would lead to degradation of the habitat, and substantial loss of plants if it occurred in the growing season.

4.8.2.8.16 Parish's Popcorn Flower

Acquisition of the only site for Parish's popcorn flower would not be prescribed, and no conservation assurances for this species could be made. San Bernardino County would consider protection on a site-specific basis if the owner applied for a discretionary permit for land use changes. Because the plant is found in wetlands, it is likely that the CEQA and wetland laws would provide protection for the occupied habitat, but the surrounding uplands could become developed.

4.8.2.8.17 Red Rock Poppy

Protection of this species relies on management of Red Rock Canyon State Park. No adverse impacts are expected to the species as a whole. Without route designation in the El Paso Mountains, the occurrences outside the state park boundaries could be negatively impacted. This is relatively unlikely because travel within Mesquite Canyon does not normally stray onto occupied habitat.

4.8.2.8.18 Red Rock Tarplant

Protection of this species relies on management of Red Rock Canyon State Park. No adverse impacts are expected to the species as a whole. Without route designation in the El Paso Mountains, the occurrences outside the state park boundaries could be negatively impacted. This is relatively unlikely because travel within Last Chance Canyon does not normally stray onto occupied habitat.

4.8.2.8.19 Reveal's Buckwheat

Although conservation would not be assured, development pressures and other threats within the known range of this species in the West Mojave are few, and no adverse impacts on the species are predicted.

4.8.2.8.20 Salt Springs Checkerbloom

Acquisition of the only site for Salt Springs checkerbloom would not be prescribed, and no conservation assurances for this species could be made. San Bernardino County would consider protection on a site-specific basis if the owner applied for a discretionary permit for land use changes. Because the plant is found in wetlands, it is likely that the CEQA and wetland laws would provide protection for the occupied habitat, but the surrounding uplands could become developed.

4.8.2.8.21 Shockley's Rock Cress

Shockley's rock-cress is not threatened in the short term within the CDCA. Without a long-term protection plan, however, industrial mining is likely to adversely impact this species and contribute to further fragmentation of the habitat.

Completion of the Carbonate Habitat Management Strategy is assumed to be part of the No Action Alternative. This document would become agency guidance for federal actions affecting habitat of Shockley's rock-cress. San Bernardino County would adopt the measures outlined in the CHMS as mitigation guidelines for County discretionary approvals. Under this scenario, impacts to Shockley's rock-cress would be reduced to acceptable levels and the goal of permanent protection would be achieved.

4.8.2.8.22 Short-joint Beavertail Cactus

Almost none of the range of the short-joint beavertail cactus in the West Mojave would be conserved under the No Action Alternative. Loss of the populations in the San Gabriel and San Bernardino Mountains foothills on private lands would be expected from long-term fragmentation of the habitat by rural and some suburban development. This adverse impact would reduce the species' range to the higher elevations of the National Forests. This species could decline to the point of being listed as threatened or endangered by state or federal agencies.

4.8.2.8.23 Triple-ribbed Milkvetch

Under the No Action Alternative, BLM would continue to consult with the USFWS on projects potentially impacting this plant. Private land projects potentially impacting triple-ribbed milkvetch would undergo CEQA review, but local jurisdictions are not obligated to provide protection, as through avoidance, for listed plant species. The risk of damage to undetected populations in washes of the San Bernardino Mountains would increase without route designation. Because of the extreme rarity of this species, without surveys and avoidance and mitigation measures, it is likely that triple-ribbed milkvetch would decline further.

4.8.2.8.24 White-margined Beardtongue

Most occurrences of white-margined beardtogue are on BLM-managed land, and this plant is considered in environmental assessments of activities that might lead to loss of numbers or habitat. No significant impacts to this species are expected. Minor loss of occupied habitat may occur as a result of increased off-highway vehicle travel in Argos Wash, retention of routes crossing wash habitat near Pisgah Crater or mining development of the private land where this species is found.

4.8.3 Socio-Economics

4.8.3.1 Livestock Grazing

Cattle Grazing: Cattle grazing operations on public land would continue to be managed under the terms and conditions of the current biological opinion. There would be no opportunity for the voluntary relinquishment of grazing permits or leases that would result in the permanent discontinuation of grazing. A permittee or lessee would be able to apply for ephemeral use, and temporary-nonrenewable grazing use under the parameters of the current biological opinion. There would be no additional restrictions on the utilization of current years production.

The most significant departure from Alternative A would be the 230 lbs/acre turn out requirement for allotments in DWMAs, which would not be established. Any additional management prescriptions in critical habitat for the desert tortoise would continue.

Cattle allotments scheduled for rangeland health assessment or re-assessment would continue to be assessed and determinations written. Changes to grazing management would occur if fallback standards were not being achieved.

Sheep Grazing: The Gravel Hills, Superior Valley, and Buckhorn Allotments would remain unavailable for ephemeral sheep grazing, but the grazing leases for these allotments would remain active. These allotments would continue to be managed under the terms and conditions of the current biological opinion. The Goldstone Allotment would also remain unavailable for ephemeral sheep grazing, however, because it is entirely within lands transferred by Congress to Fort Irwin in 2001. As a result, this allotment is no longer available for lease or management by the BLM.

Ephemeral sheep grazing operations on public land would continue on the middle and eastern units of the Stoddard Mountain Allotment, and on non-critical desert tortoise habitat in the Shadow Mountain Allotment. The Johnson Valley Allotment, currently vacant, would continue to be available for lease. The following allotments would continue to be managed under the terms and conditions of the current biological opinion, extended on May 17, 1999: Antelope Valley, Bissell, Boron, Buckhorn Canyon, Cantil Common, Gravel Hills, Hansen Common, Johnson Valley, Lava Mountain, Monolith-Cantil, Rudnick Common, Shadow Mountain, Spangler Hills, Stoddard Mountain, Superior Valley, Tunawee Common, and Warren.

Ephemeral sheep allotments scheduled for rangeland health assessment or re-assessment would continued to be assessed and determinations written. Changes to grazing management would occur if fallback standards are not achieved and ephemeral sheep grazing is determined to be the primary cause.

4.8.3.2 Mineral Development

Tortoise mitigation results in substantial costs to miners if operating within designated Critical Habitat (BLM Category I, II) or BLM Category III habitat. As with Alternative A, these measures include the requirement for compensation associated with disturbing or fencing off tortoise habitat, the use of an authorized biologist for surveys, and confining vehicle speed to 20 miles an hour. The added cost of compensation results in some operators seeking stone or aggregate from sites further removed from the market area. There is no expedited method under this alternative for issuing incidental take permits, unlike Alternative A. Thus the time and cost savings when putting a mineral project on line that expedited permitting provides would not be available. Consultation on a project-by-project basis would continue, with the exception of the desert tortoise and proposed disturbance under 10 acres that is covered by an existing biological opinion. Under this opinion, a total of 21 mitigation measures are required to avoid a jeopardy opinion. Projects that would disturb over 10 acres would require formal consultation with the FWS, a delay of up to 135 days.

In designated critical habitat for the tortoise, vehicular access may be controlled by imposition of seasonal-use restrictions for hauling and road maintenance as suggested by the USFWS Recovery Plan (1994, p. 60). This mitigation is applied on a project basis, depending on its practicality or economic impact on the operation. The seasonal-use restriction may require the operator to stockpile material at the mill or off site if the operator is to maintain year-round sales, and is workable for certain commodities where sales volume is limited and year-round mining is not required. Because San Bernardino County is in non-attainment for PM-10 dust, projects generating dust beyond an established threshold would be required to reduce travel over non-maintained routes to 15 miles per hour.

Compensation for lost tortoise habitat is applied only in occupied habitat or suitable habitat near occupied habitat based on a formula taking into consideration the term of the project, category of habitat, impacts on adjacent habitat, growth inducing effects and existing disturbance. Sand and gravel deposits, if in or near designated critical habitat, tend to require compensation. Side hill construction material quarries, and metal and industrial mineral development in steep, rocky terrain, may or may not require compensation depending on the results of a survey. The key issue under this alternative is that while survey costs may be required for mineral development activities, mitigation costs apply only if tortoises are "affected". Areas devoid of tortoise or non-habitat areas would not require compensation mitigation or surveys under this alternative.

Presence-absence surveys are required if within the suspected range of the desert tortoise or MGS. Clearance surveys are required if tortoise sign is found or the area is fenced off. Few or no habitat protection measures are prescribed if no tortoise sign is found during the presence-absence survey. Mitigation for oil and gas leases in Category I and II habitat is based on the 1975-1982 tortoise sign surveys rather than presence-absence surveys. Such leases carry a standard stipulation allowing BLM to recommend modifications to site- specific exploration and development proposals "to further its conservation and management objective to avoid BLM-

approved activity that would contribute to a need to list such a species or their habitat." Mitigation for site specific oil and gas activity includes fencing, compensation for lost habitat, seasonal-use restrictions, and, if necessary, disapproval if the proposal is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat.

Surveys for MGS tend to be expensive and time consuming because seasonal trapping is required. Counties require surveys for MGS regardless of whether the project is on private or public lands. This requirement affects operators on BLM land if the SMARA threshold of one acre of surface disturbance is exceeded. Impacts are the cost of hiring a biologist and delays to conduct the surveys. CDFG compensation and endowment fees are required on non-BLM land at the rate of $350 per acre.

Under the SMARA, operators disturbing over an acre of ground or removing over 1,000 cubic yards must incur the cost of a Reclamation Plan if on public land and including a Site Approval Permit if on private land, filed with the state lead agency.

No mining is occurring on land with an ACEC designation. Few contain areas of moderate to high mineral potential with the exception of Juniper Flats. Examples where costly mitigation or restrictions on access to and availability of mineral resources apply are the Rand Mountains-Fremont Valley Management Area where discretionary mineral actions are prohibited (mineral leasing and sales from public lands), and the carbonate plants habitat requiring costly surveys and avoidance of the threatened and endangered plants.

By maintaining Research Natural Area status for the Pisgah area (instead of an ACEC), and an adaptive management strategy instead of withdrawals for Lane Mountain more access to economically viable mineral deposits would be available under this alternative. This would contribute to the sustainable development of mineral resources in the planning area, including aggregate and other industrial minerals that might be in great demand throughout the life of this management plan.

Impacts on selected areas having sensitivity to biological resources are outlined below.

Impacts on carbonate rock mining in or near carbonate plant habitat in San Bernardino County are similar to those under Alternative A. On BLM lands 1,585 acres have been designated as critical habitat for the carbonate plants. Mining on these lands would not be authorized unless the proposal received a non-jeopardy opinion from the FWS. In addition to current mitigation, including surveys and avoidance, other mitigation would be developed either by adoption of the Carbonate Habitat Management Strategy (CHMS) or through the NEPA process and consultation. CHMS management of the carbonate plants would be the same under all alternatives.

As more is learned about the carbonate plants' ability to propagate in reclaimed areas, a more adaptive management strategy, as opposed to a withdrawal, could be in place before the end of the West Mojave Plan's term. This would allow carbonate rock mining with reduced compensation and less stringent conservation requirements. Compensation may include offering to remove all plants, seeds and topsoil, and then revegetate upon completion of mining. Compensation for development disturbance may also require the operator to reclaim other disturbed areas to acceptable habitat. Successful, self-sustaining populations of Parish's daisy and Cushenbury buckwheat at the White Knob carbonate mine have been established as a result of current work by Rancho Santa Ana (Fife, 1999, p.466).

The Brisbane Valley population of the Mojave monkeyflower is located in an area where there is high mineral potential for gold, sericite and clay deposits. The No Action Alternative's requirements would be less costly than Alternative A, which imposes a 5:1 compensation within the conservation area for lost habitat if the mining claim were found to be valid.

Projects within the Pisgah Research Natural Area would continue to require a tortoise survey and case-by-case review if the white-margined beardtongue plant, a sensitive species, occupies the mineral project area.

Management of mining activity in habitat for the Lane Mountain milkvetch would continue to require that any surface disturbing activity requiring approval or review within the area mapped as habitat would require a survey, mitigation or avoidance if plants are found in harms way, and Section 7 consultation. Currently, dry wash sluicing is considered casual use and a plan of operations is not required unless operators drive off existing routes, dig up perennial plants, or use mechanized earth moving equipment. Noncommercial hobby gold collection could be done as a recreation activity without authorization under 43 CFR 8365.

Mitigation for sensitive bats occupying underground mines in the Pinto Mountains would include surveys by the operator and construction of bat gates. If significant bat roosts occupy proposed work areas, these bats and roosts would have to be removed by the surface managing agency.

A large portion of the Big Rock Creek sand and gravel deposit, on either side of Highway 138, is in the proposed expanded SEA boundary being considered by Los Angeles County. Future sand and gravel development would probably be severely constrained by management practices recommended by Los Angeles County which include limiting development densities, reducing the need for grading and other habitat disturbances, and retaining "rare" plant communities, including desert alluvial fan scrub and desert alluvial wash (PCR Services Corp., et al., 2000, p. vii & 3). This impact would not be noticed within the next 30 years (the West Mojave Plan's term) because the forecasted depletion date for common aggregate at the nearby Little Rock Wash fan is not until 2046 (Beeby et al., 1999).

In summary, by the year 2033 the No Action Alternative would lead more costly but relatively accessible mineral deposits. It is predicted that within 20 years, shortages of aggregate and other minerals would occur in southern California because of increasing consumption associated with increasing population, non-mineral development encumbering deposits, and depletion of more accessible deposits. In addition, high development costs associated with mitigation and limitations on access and availability of mineral deposits because of conflicts with sensitive species would result in some deposits being placed off limits to development. Borates and quality carbonate rock could become scarce by 2023, and the cost of finding, developing, and mining new deposits would increase along with the products dependant on them. These include products dependant on carbonate rock such as Portland and lime cement and ground calcium carbonate (GCC) used as extenders, whiting, coating (paper) and fillers in many products. This has implications for energy conservation, or the lack of it, because GCC makes up to 50 percent of all vehicle tires, replacing millions of barrels of oil. In many other products GCC replaces 40 to 80 percent of the resin feed stocks that are also derived from crude oil (Mark Rey, Jan. 9, 2002, Sierra Times).

4.8.4 Motorized Vehicle Access Network

Alternative G would not include the modifications to the June 30, 2003 network that were suggested by Draft EIR/S commentators. Although these minor modifications do not constitute, individually or collectively, a significant change in the overall network, they did resolve a number of concerns and weaknesses present in the June 30, 2003 network. Their lack of resolution in this No Action alternative would have the following consequences:

- **Juniper Flats:** Sensitive riparian habitat in Arrastre Canyon, Grapevine Canyon and other isolated springs would receive less protection than under Alternative A due to the larger number of routes designated open that provide access to and traverse these sensitive sites. This would create fewer opportunities for the endangered Least Bell's vireo to establish new nesting sites in this area than Alternative A. The network would be less compatible with vehicle-sensitive species, such as the San Diego horned lizard. Access needs would not be met as effectively, because the June 30, 2003 network was designed without the aid of the findings of a detailed field survey. Thus the precise locations of campsites, staging areas and other recreation venues were not known and would not be served as effectively as the revised network. Finally, BLM would lack an express public commitment to monitor conditions along the single-track loop route in this subregion (composed of RJ 1056, 1057, 1058, 2037 and 2057).
- **Conservation Areas:** The density of routes in the vehicle-sensitive Lane Mountain milk vetch, Barstow woolly sunflower and Mohave monkeyflower conservation areas would be retained at present levels, resulting in a vehicle network that was less compatible with conservation of the species. The additional open routes would provide little in the way of enhanced vehicle access, as they are not major connectors, nor are they popular looping or touring routes.

- **Haiwee Reservoir Access Route:** No motorized access to the eastern side of the Haiwee Reservoir would be available. The route to be opened is an existing route, has been used by desert visitors in the past, threatens no known sensitive resources, and was overlooked by the 1985-87 designations. Retaining the closure of this route could encourage persons desiring access to utilize other means to reach this area that might present greater threats to the effective management of resources.
- **Competitive "C" Routes:** Users displaced from recreation play areas in the tortoise DWMAs would lack the ability to conduct competitive recreation activities in an area more conducive to this land use than most West Mojave public lands. The plan would have less flexibility to deal with recent trends in motorized access uses, which have included a large increase in visitor use in the vicinity of the community of Red Mountain. Such use, not being targeted toward a particular area, could spread generally throughout public lands in the region.
- **Plan Maintenance:** Procedures for making minor modifications to the route network through plan maintenance would be less flexible than under Alternative A, and the resulting process would be a less adaptable form of access management

4.8.5 Cultural Resources

On-going impacts to cultural resources from the existing route network would continue at existing levels, much of which is described in Alternative A. In some areas, impacts from existing routes are severe and significant resources are being degraded or completely lost.

4.8.6 Cumulative Impacts

Biological Resources: Cumulative impacts of the No Action Alternative on the unique and declining species of the Mojave Desert could be very significant. Fragmentation and degradation of habitat leading to a loss of species and ecosystem function would occur in some areas, particularly the southern and western portions of the planning area.

Considering the human population growth forecasts for the West Mojave region, the fragile desert landscape cannot withstand a continuation of existing management of private lands. Using the city and county General Plans as a guide, urban expansion will extend into large areas of the western and southern portion of the planning area. The demand for new roads, flood control, utilities and industrial sites will increase. Demand for water has already exceeded supply in the Mojave Basin and other areas, and overdraft may extend to other basins within the West Mojave. The consequences of lowered water tables, modified stream channels and edge effects from urban expansion on the plants and wildlife of the West Mojave are very adverse in the long term.

Maintaining the existing BLM Category I, II and III habitat designations, without more, would render tortoise conservation in the western Mojave Desert inconsistent with the strategy being implemented not only throughout the listed range of the tortoise, but with the strategy currently being implemented elsewhere on public lands within the California Desert

Conservation Area, where DWMAs have already been established. By not changing the designation of public lands in areas proposed as DWMAs by Alternative A from Class M to Class L, the multiple use class designation approach applied in the western Mojave Desert would be inconsistent with that taken by the BLM's NECO and NEMO plans, and would provide less protection that either of those strategies.

Recreation pressure on desert areas will also increase. Uncontrolled recreation on public lands is not a viable scenario for conserving important species and habitats. Without route designation and expansion of visitor facilities impacts of recreation to BLM managed lands will be adverse. The No Action Alternative would continue the pattern of off road travel on redundant and parallel roads, roads in washes, and roads passing through rare plant communities, occupied habitat for sensitive species, and designated critical habitat for listed species. Cumulatively, an excess of routes through habitat leads to slow degradation of the plant communities and overall ecosystem. Weedy species invasion is one aspect of habitat degradation that can be attributed to routes of travel. As new linear corridors are created, weeds invade further into natural blocks of habitat. Certain plant species, including Barstow woolly sunflower and Little San Bernardino Mountains gilia, are intolerant of weeds and may show declines in numbers and local range. Other animal species, including the desert tortoise, cannot receive the high nutritional value present in native annuals when the only available forage is weeds.

No action on route designation will increase the potential for off road travel. Without an education and enforcement program, and signing of open routes, the public will continue under the impression that off road travel is allowable anywhere it is possible (outside wilderness and established ACECs). Desert washes and desert playas in particular are likely to receive increased use and consequent degradation, given the demand for increased recreation in the West Mojave.

Livestock Grazing: There would be few new cumulative effects. Most cumulative effects already occurred when the stipulations from the biological opinions were implemented in the early 1990's. The new stipulations from the most recent extension may temporarily or permanently reduce livestock numbers or allotments.

Minerals: There would be minimal cumulative impacts because no new withdrawals are proposed, maintaining access and availability to mineral deposits in the area for future development. Nevertheless, survey and mitigation costs under this alternative would have a slight negative cumulative effect on mineral development when combined with the restrictions on access and availability to mineral resources currently encumbered by development restrictions under the 1994 CDPA. This is because conflicts with carbonate plants and costly mitigation such as compensation has placed some deposits off limits to mining, rendered others uneconomic, and prevented expansion of some that could otherwise have expanded or gone into production.

From a regional standpoint, the minerals situation after 30 years would be similar to Alternative A. On a local scale such as the Oro Grande area, the comparative negative effects under Alternative A would be more noticeable (see discussion in Alternative A). Commodities that would be affected the most would be construction aggregate and possibly some clay deposits

that could be used in the cement industry and for specialty uses.

Recreation: Many of the designations did not necessarily take into consideration current or future recreational needs or environmental concerns (e.g. species listed since the mid-1980s) and were not developed at a time when the effects of other current planning actions could have been considered. As a result, this alternative does little to address the cumulative effects of its actions on those changes to recreation, commercial or environmental needs that have occurred during the last two decades. These changes include a significant evolution in motorized recreation. The OHVs available in 2003 (such as dual sport motorcycles and SUVs) have significantly greater range and in many cases, greater technical capabilities for mastering rough terrain than their counterparts of twenty years ago. The routes designated under this alternative may have met the needs of early 1980s vehicles, but those same routes today do not meet the varied technical or touring requirements preferred by motorized recreationists today. As a result, this alternative's comparatively utilitarian route network is deficient in meeting the needs of today's motorized vehicle enthusiast.

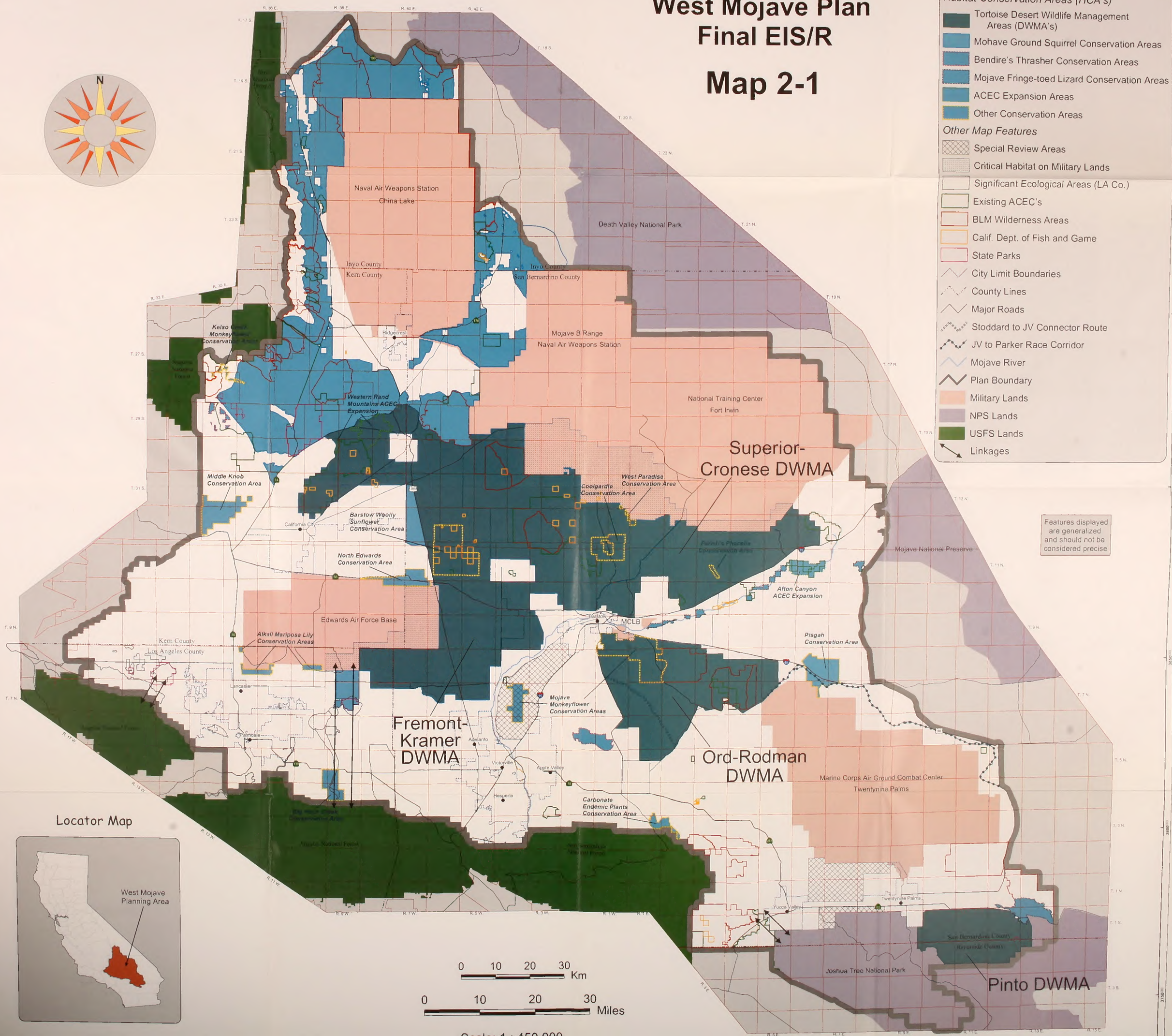
To find the recreation experience they are seeking, greater numbers of visitors may travel outside of the planning area, to the NEMO and NECO planning units, where motorized networks designed with today's motorized vehicle user in mind are being implemented. Within the planning area, compliance problems could rise as these motorized recreational enthusiasts seek out or create informal routes that better meet their needs.

Map 2-1 - Alternative **A** Conservation Areas

Alternative A Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-1



Legend

Habitat Conservation Areas (HCA's)

- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands
- Linkages

Locator Map

0 10 20 30 Km

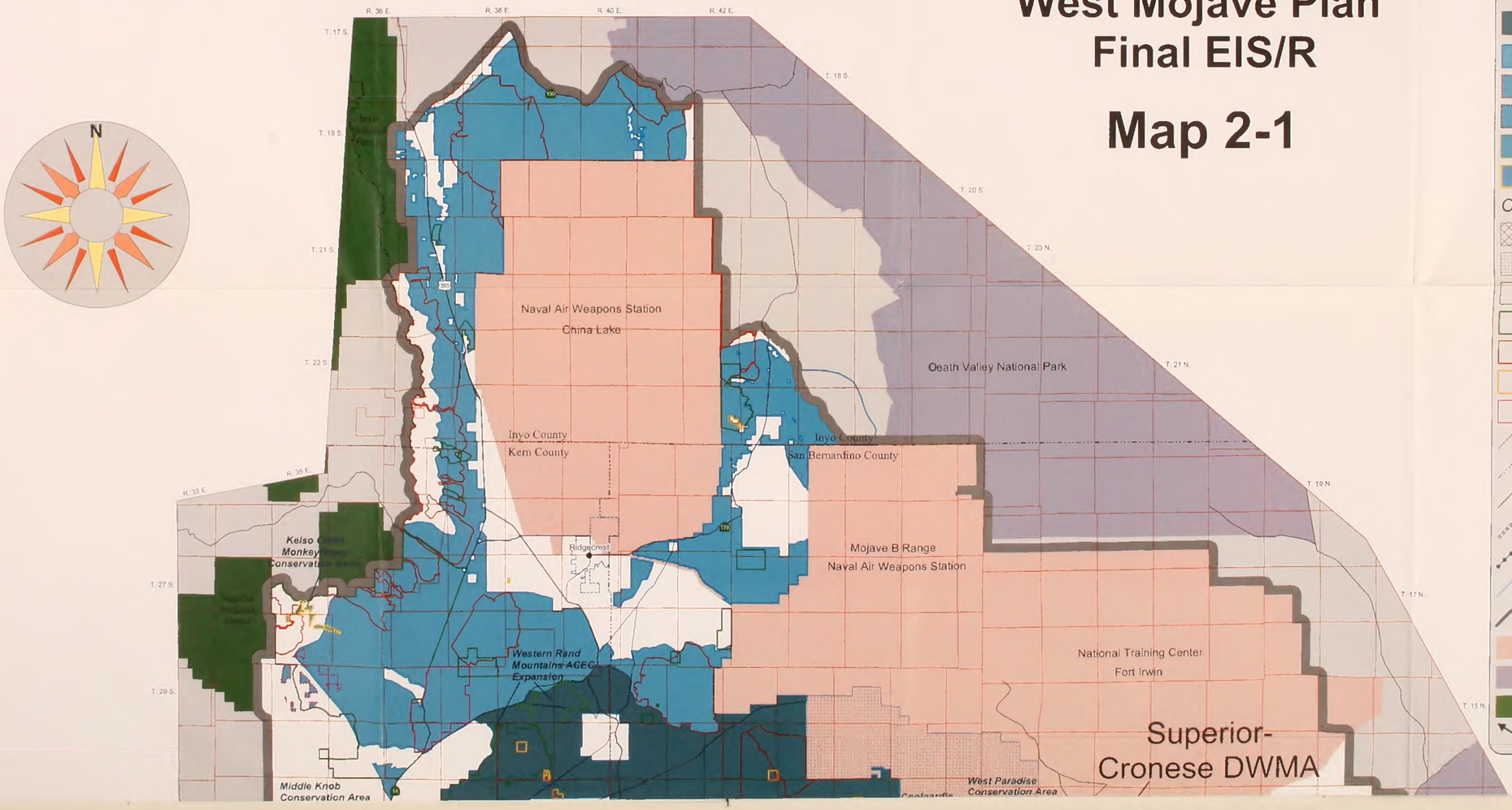
0 10 20 30 Miles

Map 2-2 - Alternative **A** Multiple Use Classes

Alternative A Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-1



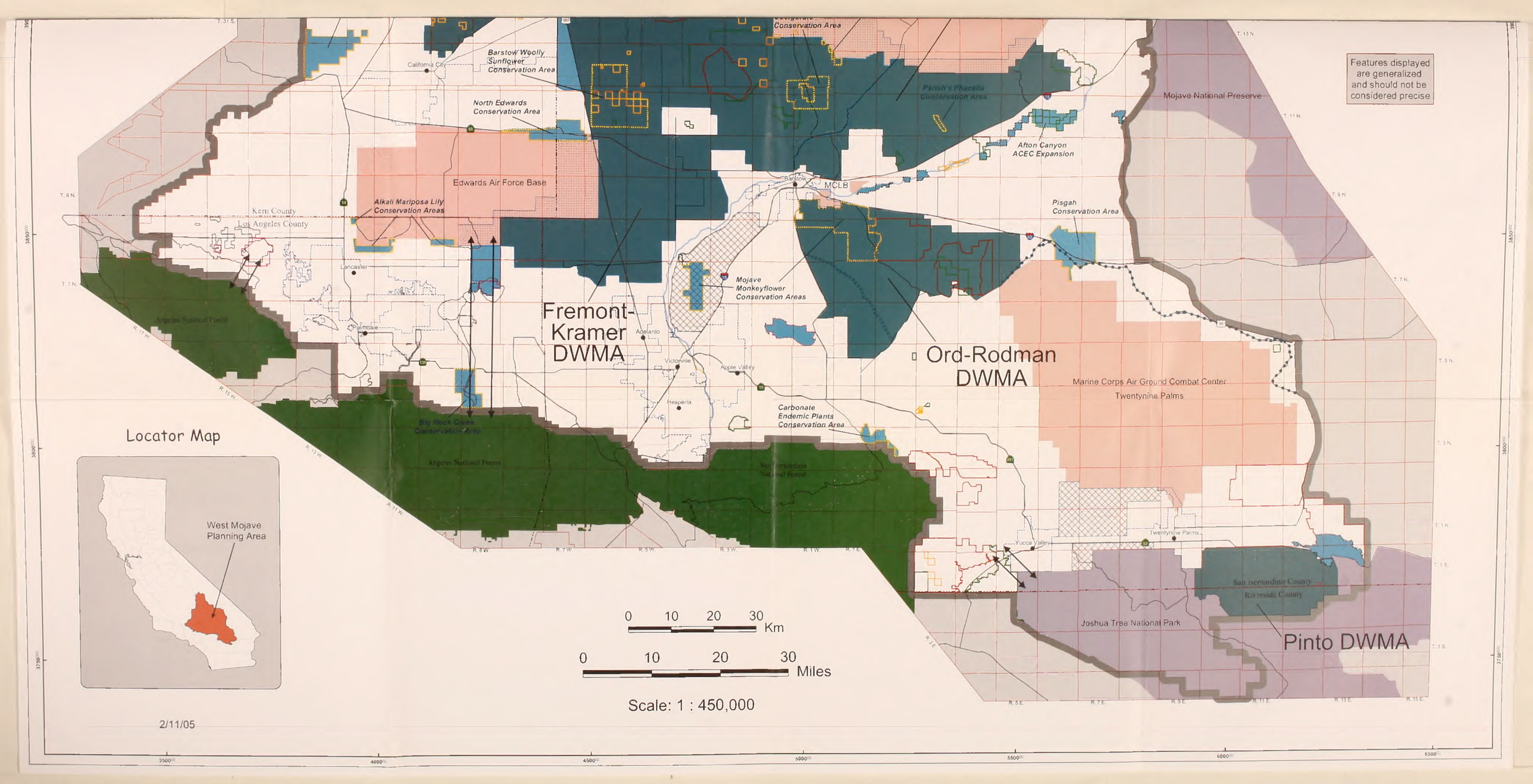
Legend

Habitat Conservation Areas (HCA's)

- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands
- Linkages


Features displayed are generalized and should not be considered precise
Barstow Woolly Sunflower Conservation Area
North Edwards Conservation Area
Parish's Phacelia Conservation Area
Mojave National Preserve
Afton Canyon ACEC Expansion
Edwards Air Force Base
MCLB
Barstow
Alkali Mariposa Lily Conservation Areas
Kern County
Los Angeles County
Pisgah Conservation Area
Mojave Monkeyflower Conservation Areas
Fremont-Kramer DWMA
Ord-Rodman DWMA
Marine Corps Air Ground Combat Center Twentynine Palms
Carbonate Endemic Plants Conservation Area
Big Rock Creek Conservation Area
Angeles National Forest
San Bernardino National Forest
Joshua Tree National Park
San Bernardino County
Riverside County
Pinto DWMA
Locator Map
West Mojave Planning Area
0 10 20 30 Km
0 10 20 30 Miles
Scale: 1 : 450,000
2/11/05

Alternative A Multiple Use Classes

West Mojave Plan
Final EIS/R

Map 2-2

N

Legend

- Cities
- City Limit Boundaries
- Highways
- County Lines
- Mojave River
- Plan Boundary

Multiple Use Classes

- BLM Limited
- BLM Moderate
- BLM Wilderness
- BLM Intensive
- BLM Unclassified
- Military
- National Park
- State Park

Other Non-BLM Lands

- Private
- City-County-Regional
- Other State
- USFS Lands

Features displayed are generalized and should not be considered precise

Naval Air Weapons Station China Lake

Death Valley National Park

Inyo County

Kern County

San Bernardino County

Ridgecrest

Mojave B Range
Naval Air Weapons Station

National Training Center
Fort Irwin

Mojave National Preserve

California City

Edwards Air Force Base

Barstow

MCLB

Kern County
Los Angeles County

Lancaster

Palmdale

Adelanto

Victorville

Apple Valley

Hesperia

Marine Corps Air Ground Combat Center
Twentynine Palms

Yucca Valley

Twentynine Palms

San Bernardino County
Riverside County

Joshua Tree National Park

Locator Map

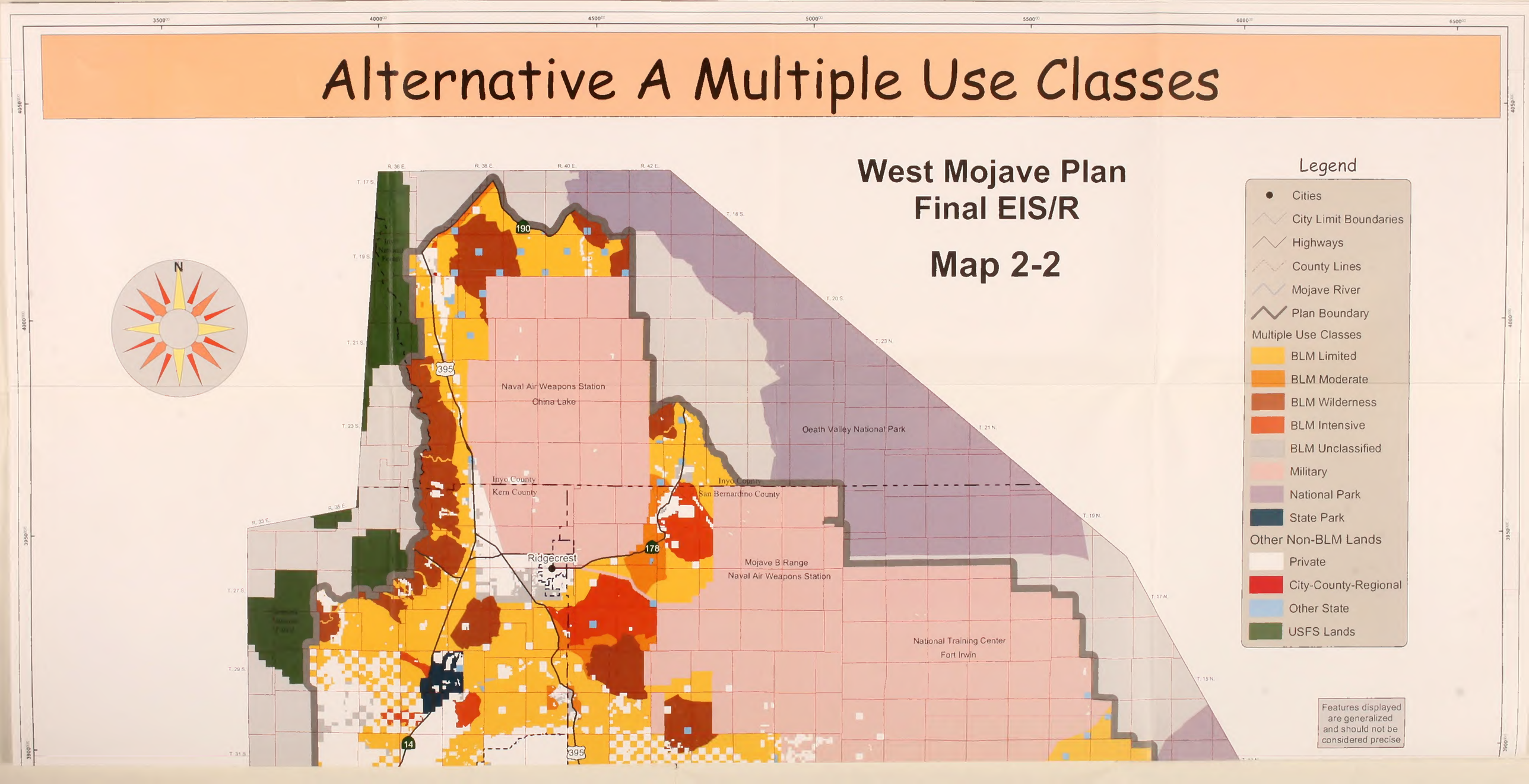
West Mojave Planning Area

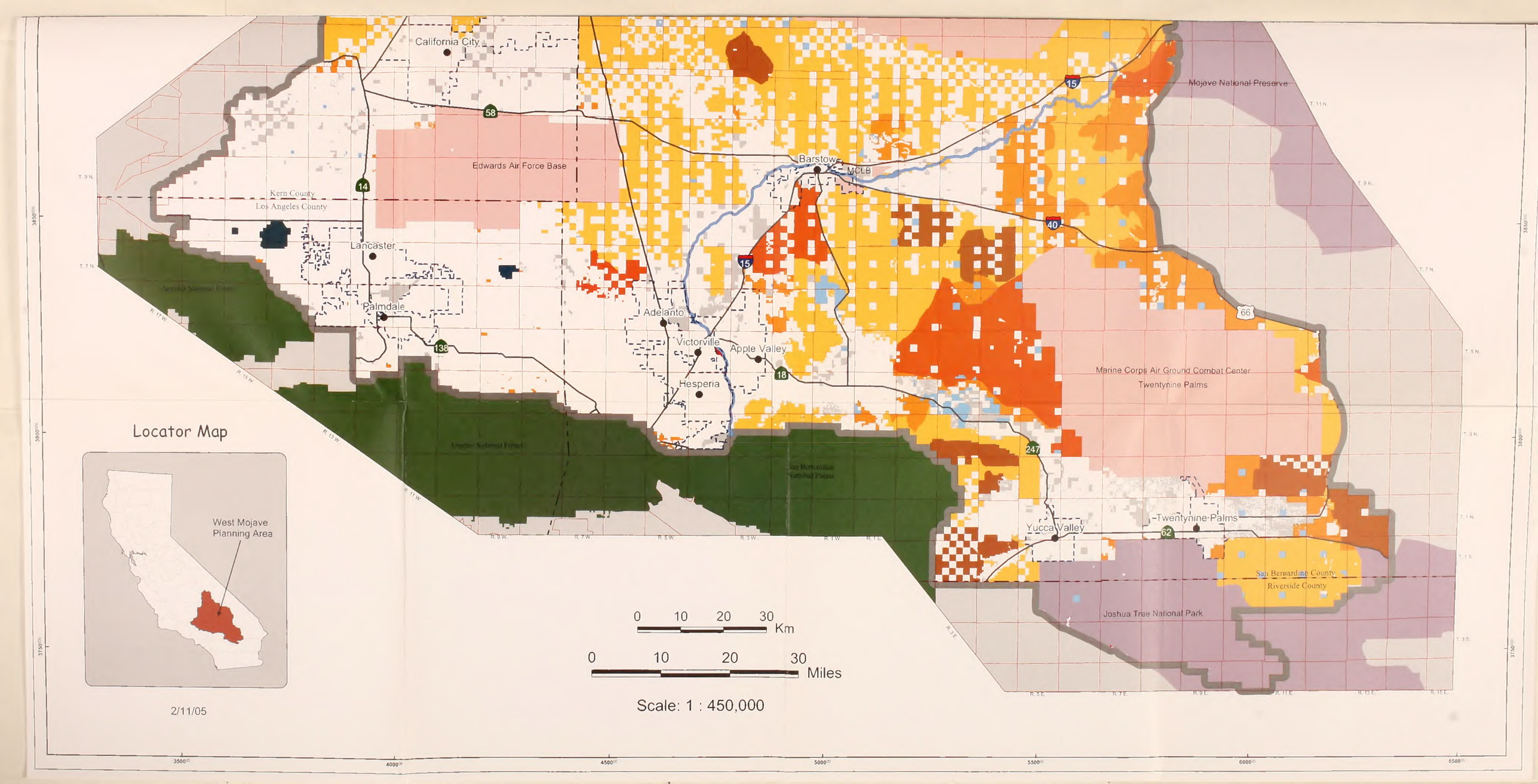
0 10 20 30 Km

0 10 20 30 Miles

Map 2-15 - Alternative **B** Conservation Areas

Alternative A Multiple Use Classes




California City
58
Edwards Air Force Base
14
Kern County
Los Angeles County
Lancaster
Palmdale
138
Adelanto
Victorville
Apple Valley
Hesperia
18
15
Barstow
MCLB
Mojave National Preserve
40
66
Marine Corps Air Ground Combat Center
Twentynine Palms
247
Yucca Valley
Twentynine Palms
62
San Bernardino County
Riverside County
Joshua Tree National Park
Locator Map
West Mojave
Planning Area
0 10 20 30 Km
0 10 20 30 Miles
Scale: 1 : 450,000
2/11/05

Alternative B Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-15

Legend

Habitat Conservation Areas (HCA's)
- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands

Features displayed are generalized and should not be considered precise

Naval Air Weapons Station China Lake
Death Valley National Park
Inyo County
Kern County
Inyo County
San Bernardino County
Mojave B Range
Naval Air Weapons Station
National Training Center
Fort Irwin
Ridgecrest
Kelso Creek Monkeyflower Conservation Area
Western Rand Mountains ACEC Expansion
Middle Knob Conservation Area
Barstow Woolly Sunflower Conservation Area
California City
Coolgardie Conservation Area
West Paradise Conservation Area
Mojave National Preserve
Afton Canyon ACEC Expansion
Edwards Air Force Base
Barstow
MCLB
Pisgah Conservation Area
Kern County
Los Angeles County
Lancaster
Palmdale
Adelanto
Victorville
Apple Valley
Hesperia
Mojave Monkeyflower Conservation Areas
Carbonate Endemic Plants Conservation Area
Marine Corps Air Ground Combat Center
Twentynine Palms
Yucca Valley
Twentynine Palms
Joshua Tree National Park
Riverside County

Locator Map

West Mojave Planning Area

0 10 20 30 Km

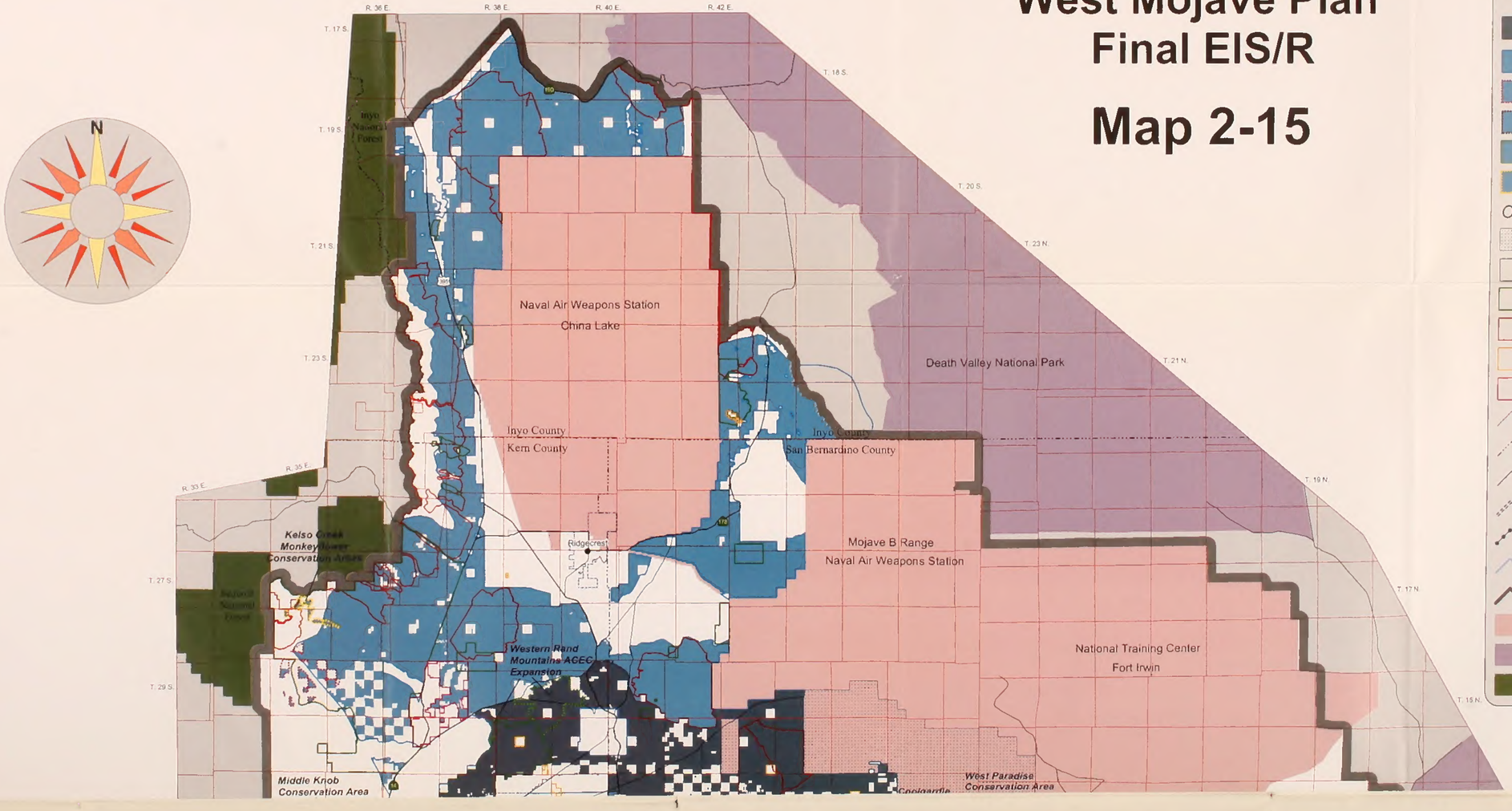
0 10 20 30 Miles

Map 2-16 - Alternative **C** Conservation Areas

Alternative B Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-15



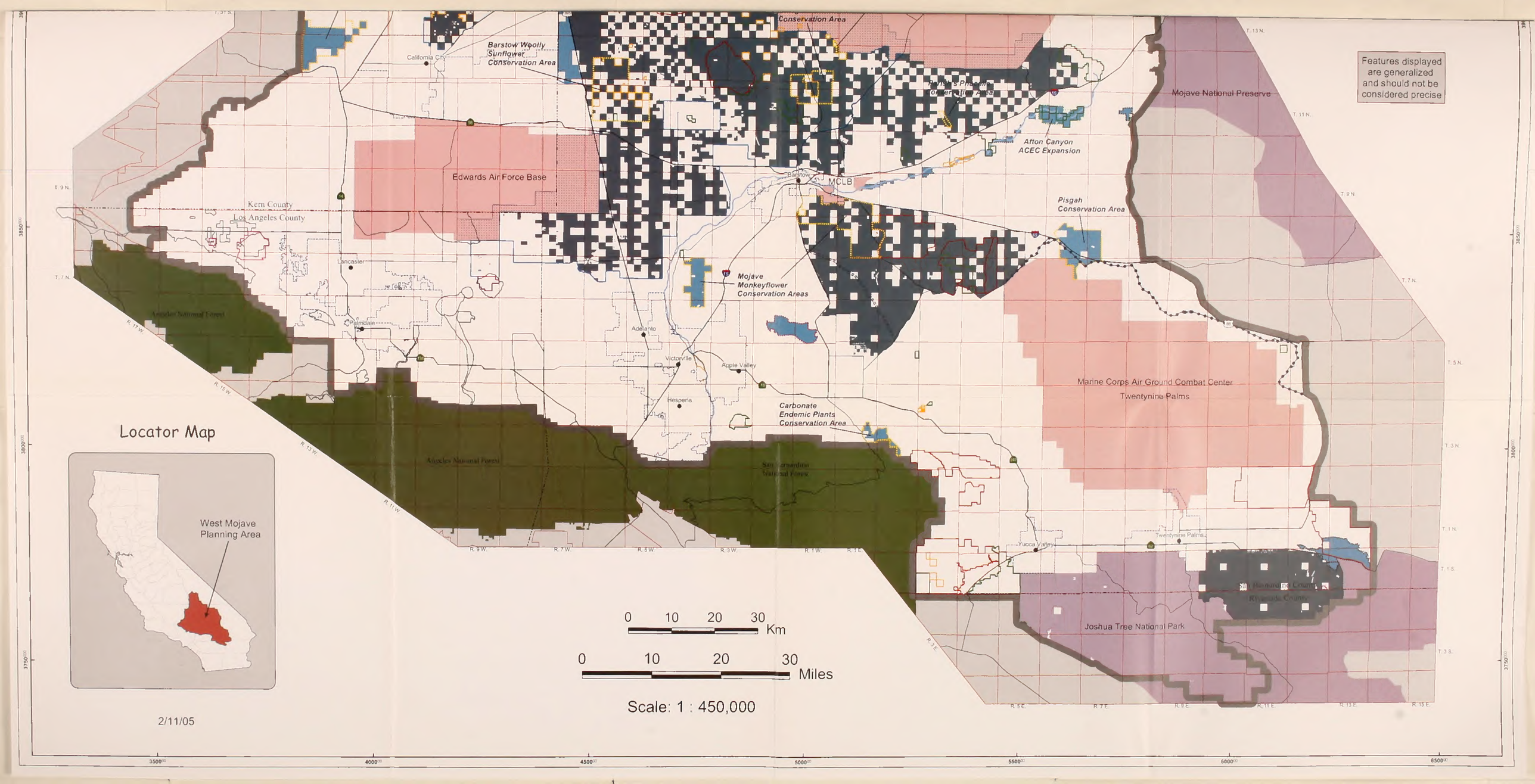
Legend

Habitat Conservation Areas (HCA's)

- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features

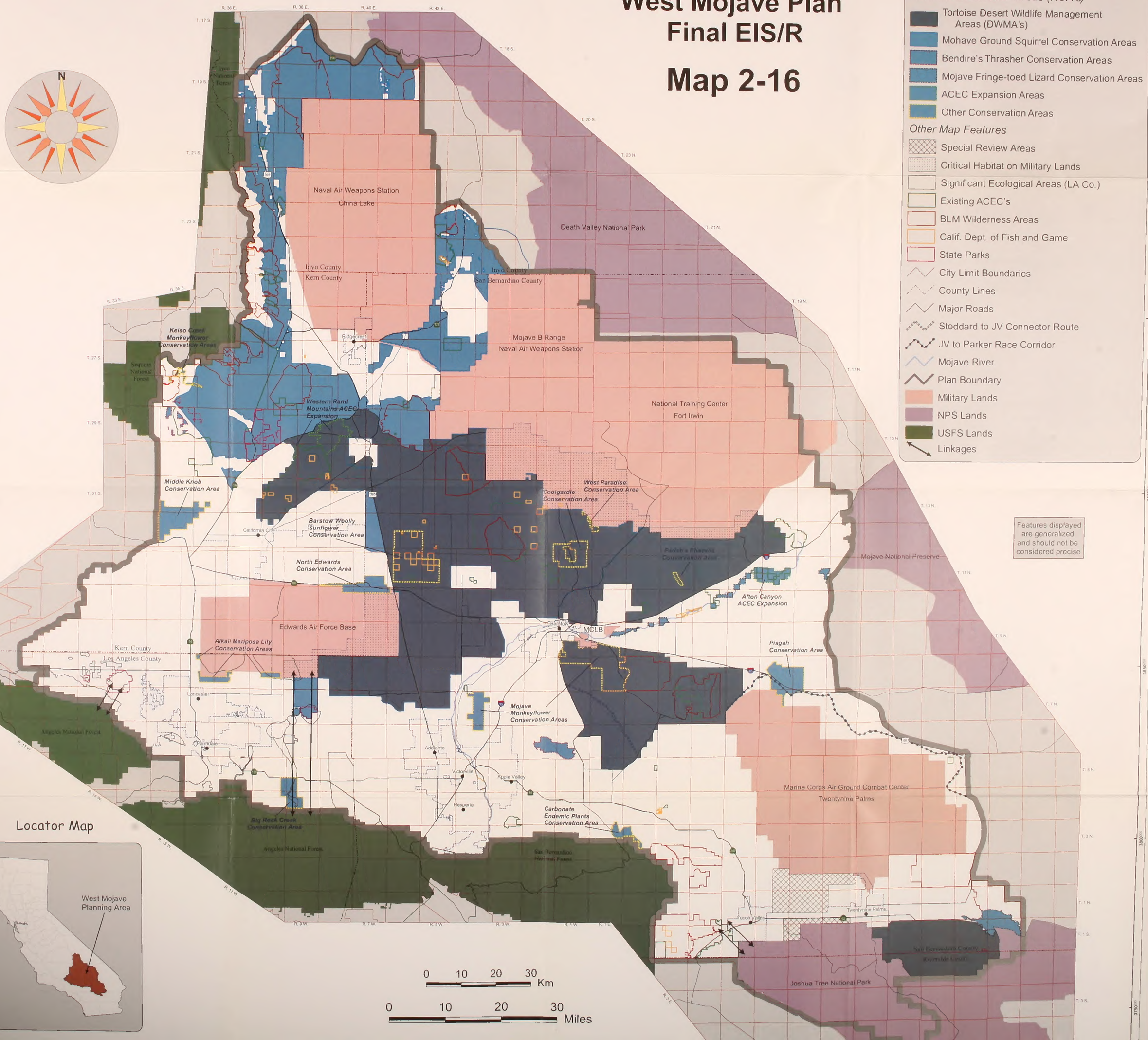
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands


Features displayed are generalized and should not be considered precise
Barstow Woolly Sunflower Conservation Area
Conservation Area
Mojave National Preserve
Afton Canyon ACEC Expansion
Edwards Air Force Base
MCLB
Pisgah Conservation Area
Kern County
Los Angeles County
Lancaster
Palmdale
Adelanto
Victorville
Apple Valley
Hesperia
Mojave Monkeyflower Conservation Areas
Carbonate Endemic Plants Conservation Area
Angeles National Forest
San Bernardino National Forest
Marine Corps Air Ground Combat Center Twentynine Palms
Yucca Valley
Twentynine Palms
Joshua Tree National Park
Riverside County
Locator Map
West Mojave Planning Area
0 10 20 30 Km
0 10 20 30 Miles
Scale: 1 : 450,000
2/11/05

Alternative C Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-16



Legend

Habitat Conservation Areas (HCA's)

- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands
- Linkages

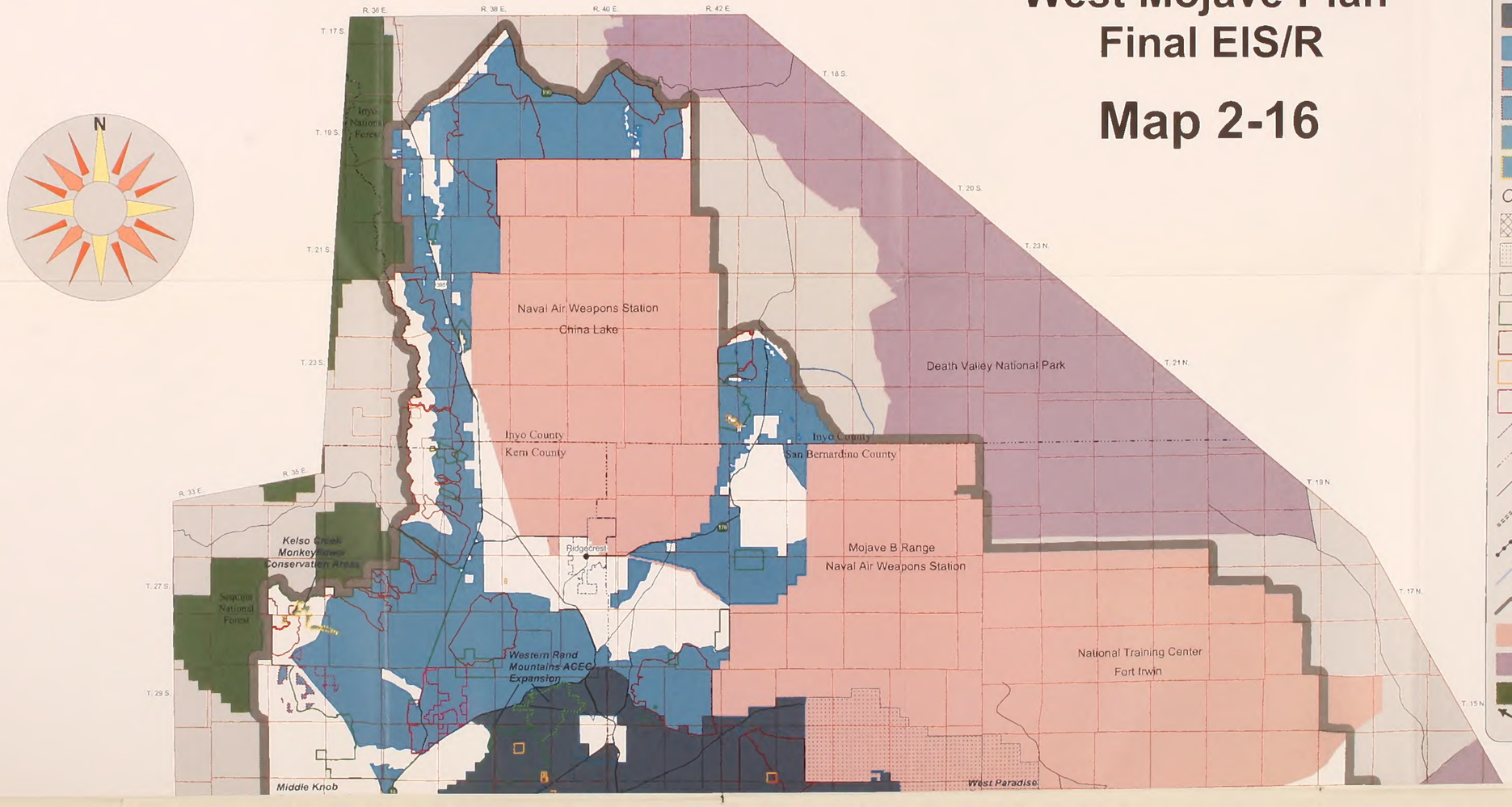
Locator Map

Map 2-17 - Alternative **D** Conservation Areas

Alternative C Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-16



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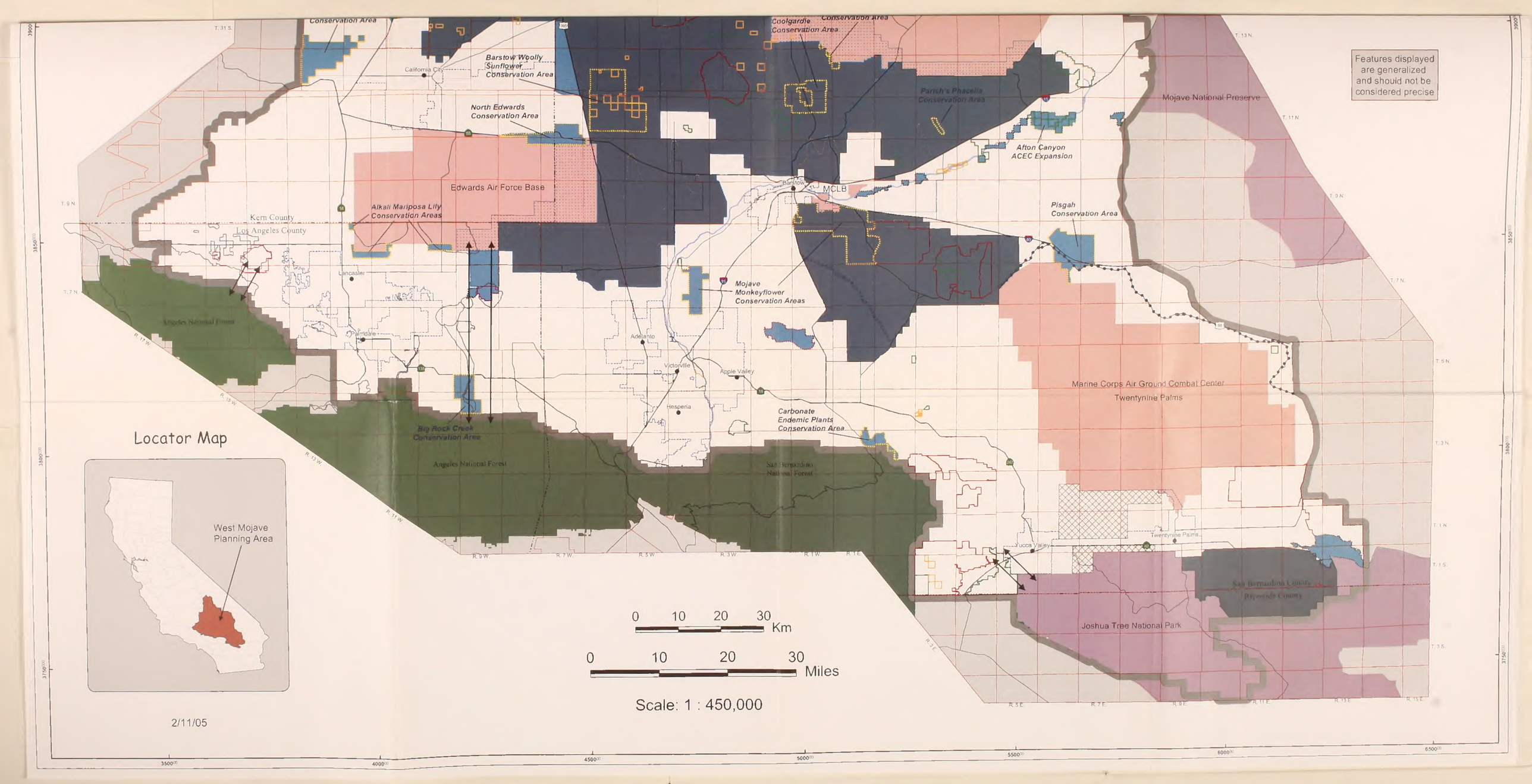
Habitat Conservation Areas (HCA's)

- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands
- Linkages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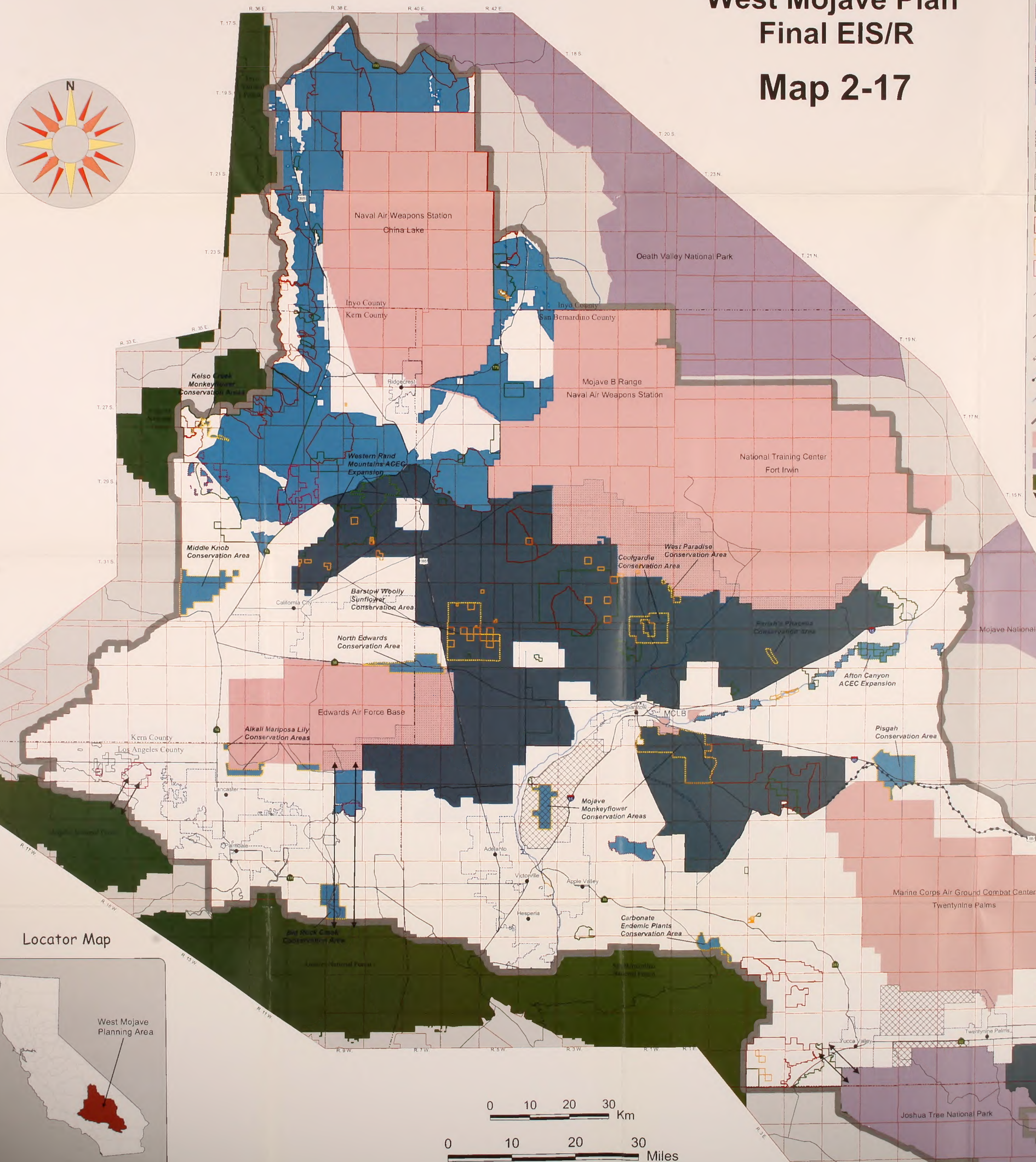
Conservation Area
Barstow Woolly Sunflower Conservation Area
California City
North Edwards Conservation Area
Coolgardie Conservation Area
Parish's Phacelia Conservation Area
Mojave National Preserve
Afton Canyon ACEC Expansion
Edwards Air Force Base
Barstow
MCLB
Alkali Mariposa Lily Conservation Areas
Kern County
Los Angeles County
Pisgah Conservation Area
Lancaster
Mojave Monkeyflower Conservation Areas
Angeles National Forest
Palmdale
Adelanto
Victorville
Apple Valley
Hesperia
Marine Corps Air Ground Combat Center Twentynine Palms
Carbonate Endemic Plants Conservation Area
Big Rock Creek Conservation Area
Angeles National Forest
San Bernardino National Forest
Yucca Valley
Twentynine Palms
San Bernardino County
Riverside County
Joshua Tree National Park
Locator Map
West Mojave Planning Area
0 10 20 30 Km
0 10 20 30 Miles
Scale: 1 : 450,000
2/11/05

Alternative D Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-17



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Features displayed are generalized and should not be considered precise

Legend

Habitat Conservation Areas (HCA's)

- Habitat Conservation Areas (HCA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands
- Linkages

Locator Map

0 10 20 30 Km

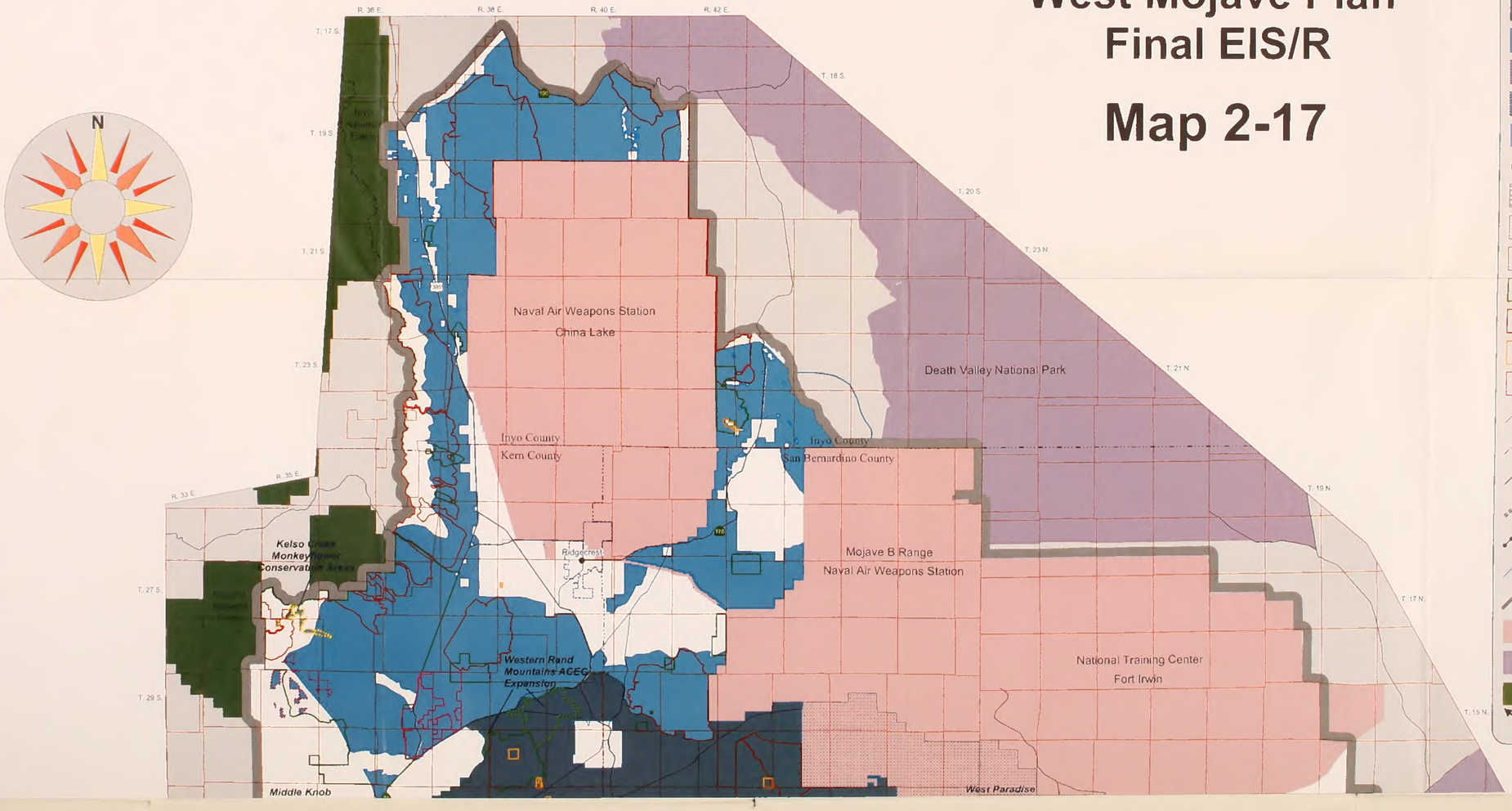
0 10 20 30 Miles

Map 2-19 - Alternative **E** Conservation Areas

Alternative D Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-17



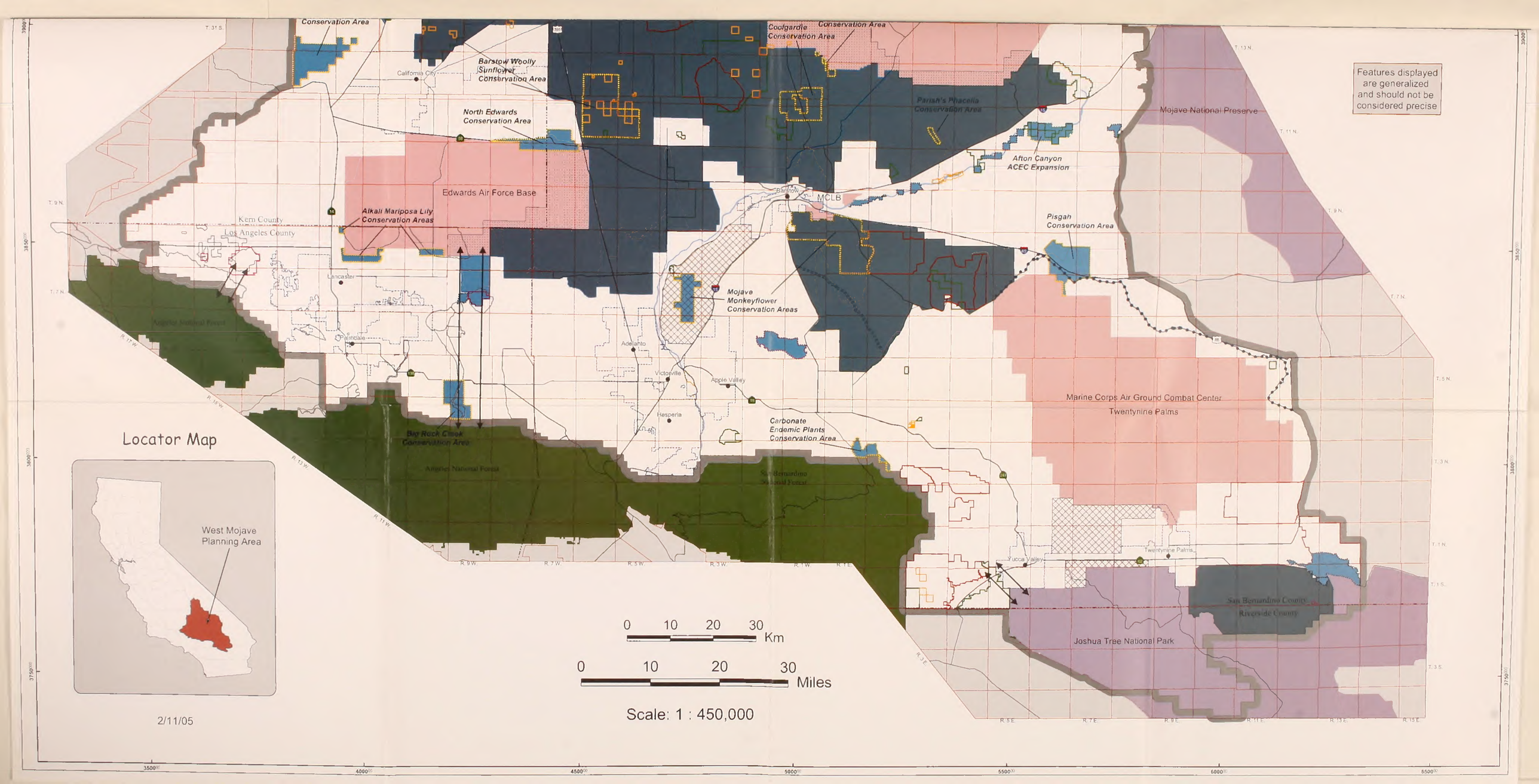
Legend

Habitat Conservation Areas (HCA's)

- Habitat Conservation Areas (HCA's)
- Mohave Ground Squirrel Conservation Areas
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- Other Conservation Areas

Other Map Features

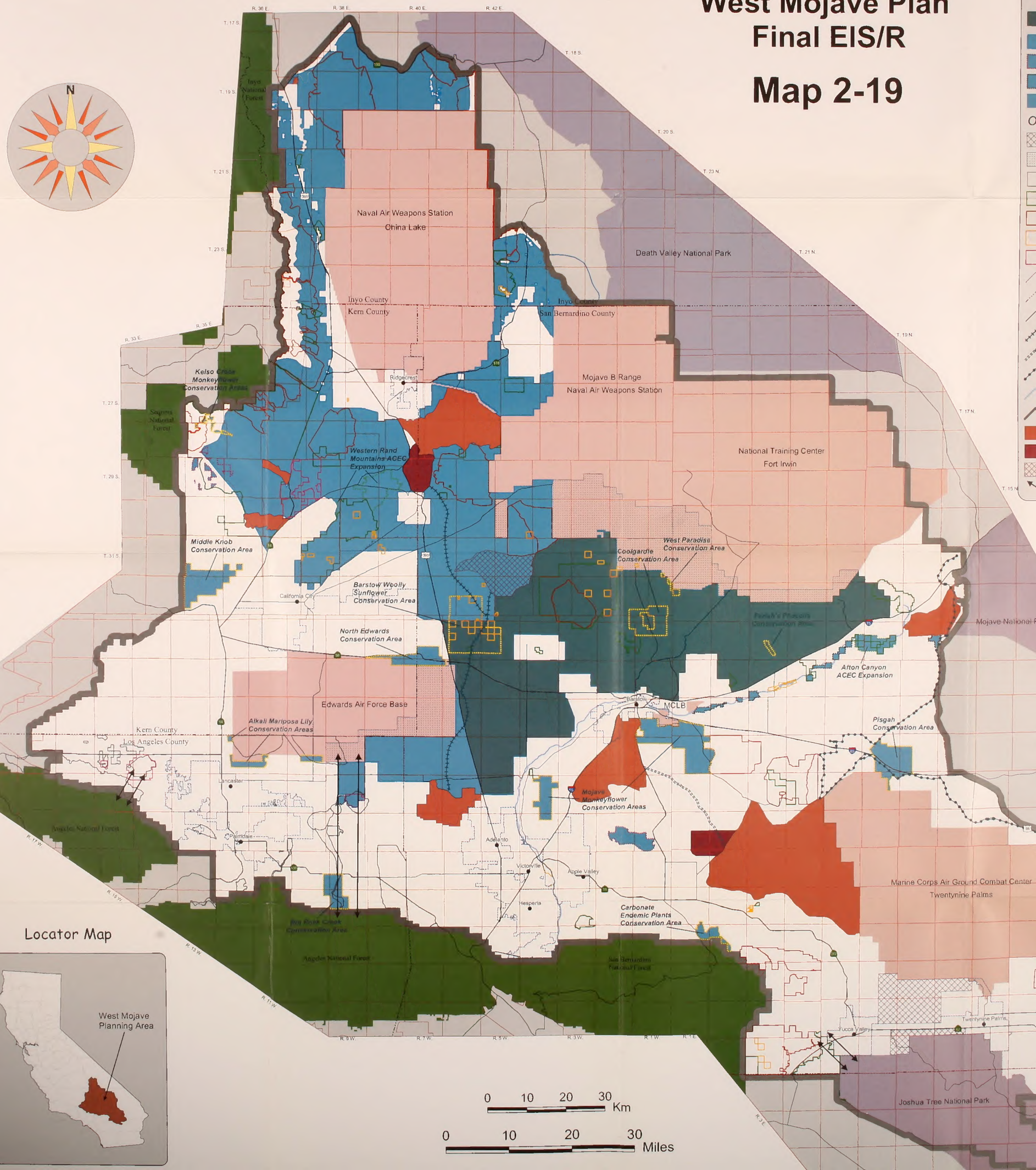
- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Military Lands
- NPS Lands
- USFS Lands
- Linkages


Conservation Area
Barstow Woolly Sunflower Conservation Area
California City
North Edwards Conservation Area
Coolgardie Conservation Area
Conservation Area
Parish's Phacelia Conservation Area
Mojave National Preserve
Afton Canyon ACEC Expansion
Features displayed are generalized and should not be considered precise
Edwards Air Force Base
Barstow
MCLB
Alkali Mariposa Lily Conservation Areas
Kern County
Los Angeles County
Pisgah Conservation Area
Lancaster
Mojave Monkeyflower Conservation Areas
Palmdale
Adelanto
Victorville
Apple Valley
Hesperia
Marine Corps Air Ground Combat Center Twentynine Palms
Carbonate Endemic Plants Conservation Area
Big Rock Creek Conservation Area
Angeles National Forest
San Bernardino National Forest
Yucca Valley
Twentynine Palms
San Bernardino County
Riverside County
Joshua Tree National Park
Locator Map
West Mojave Planning Area
0 10 20 30 Km
0 10 20 30 Miles
Scale: 1 : 450,000
2/11/05

Alternative E Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-19



Legend

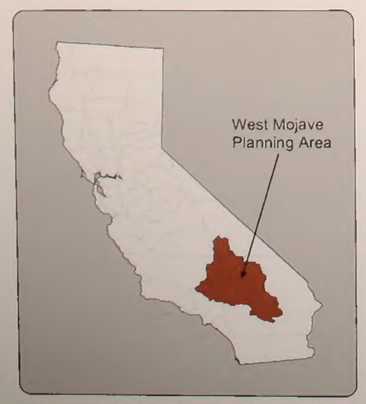
Habitat Conservation Areas (HCA's)

- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Area
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Enduro Route
- Connector Route
- Race Routes
- Mojave River
- Plan Boundary
- Existing Open Areas
- Open Area Expansions
- Fremont Recreation Area (New)
- Linkages

Locator Map

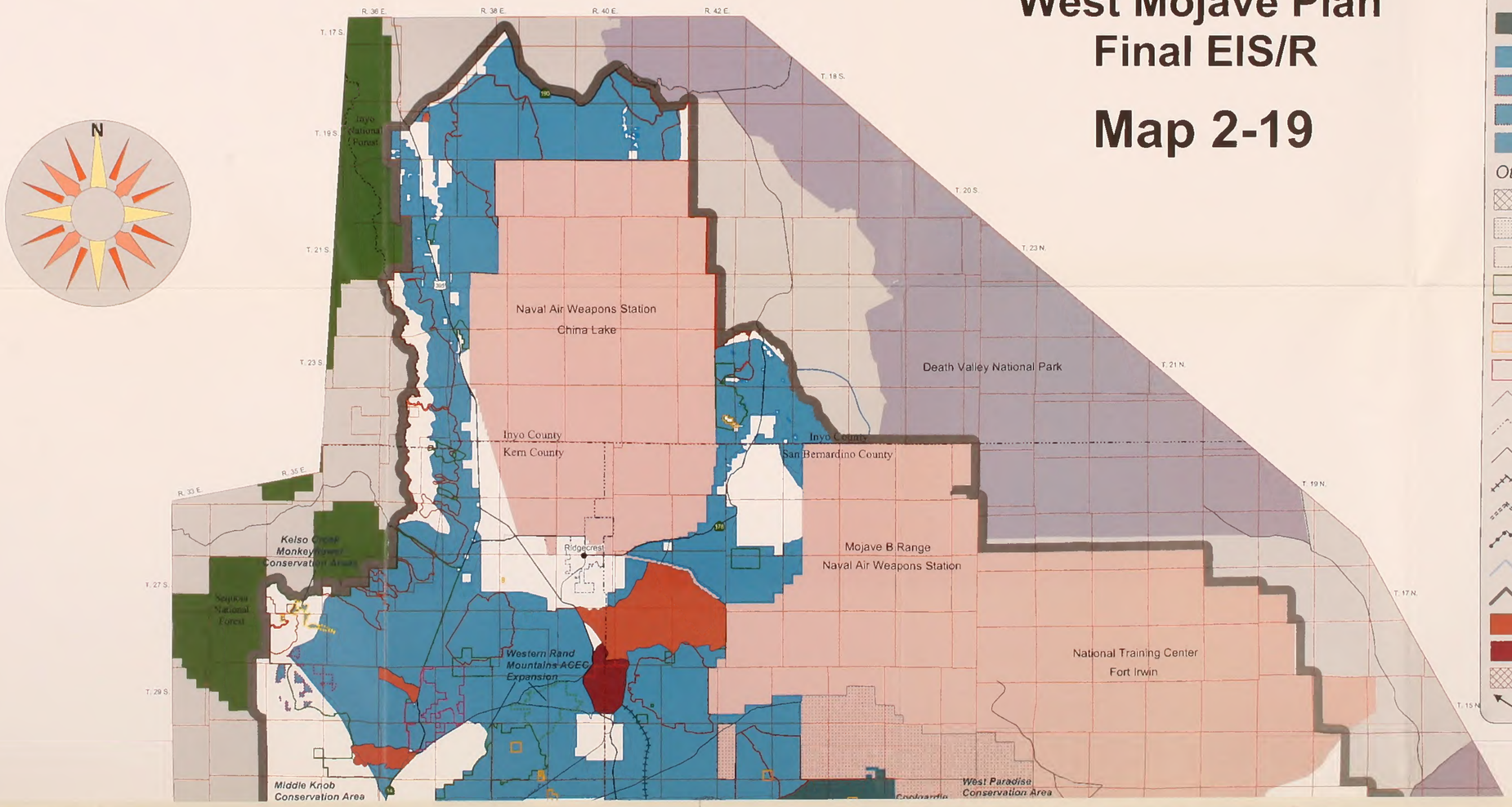


Map 2-21 - Alternative **F** Conservation Area

Alternative E Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-19



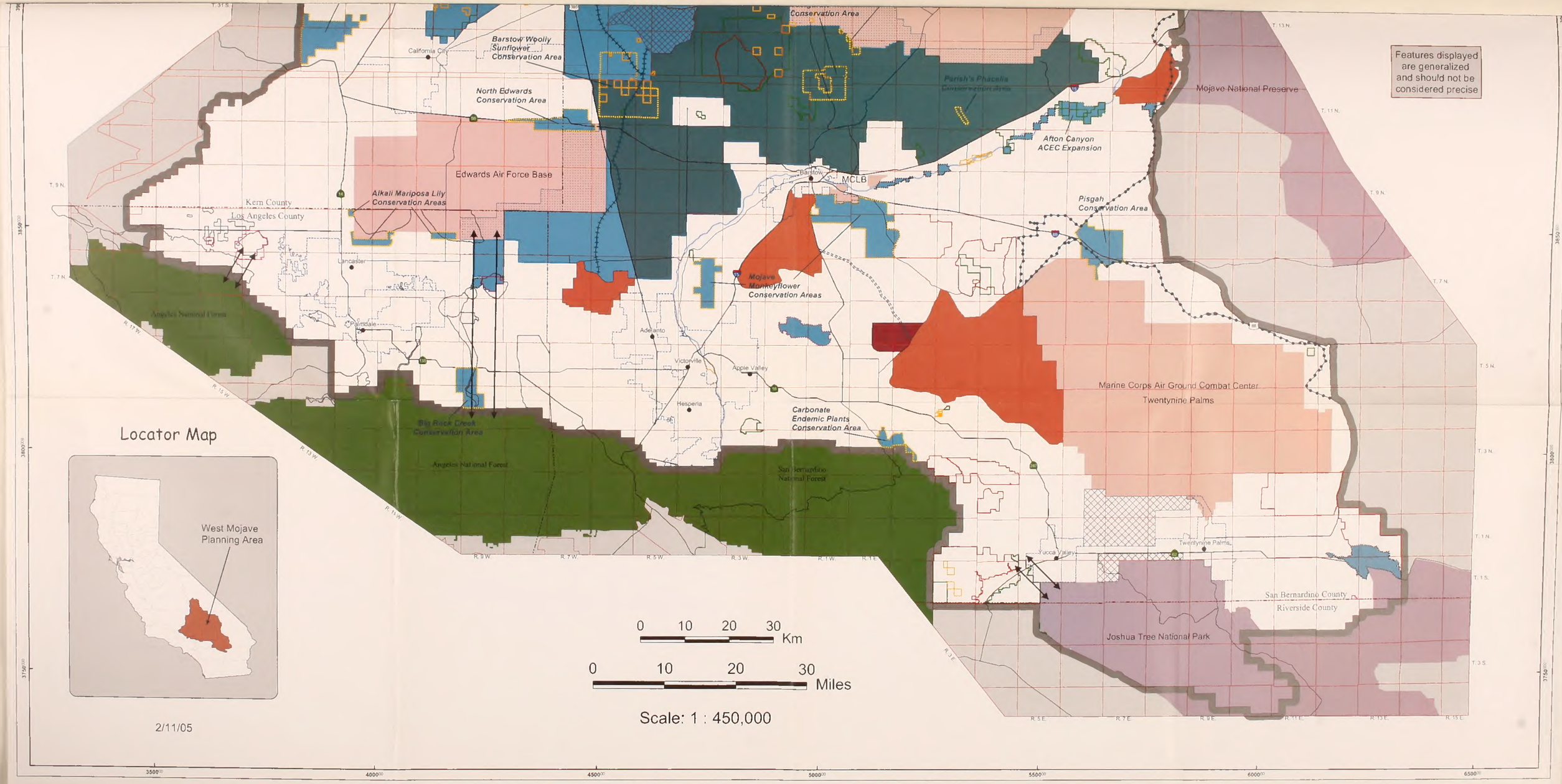
Legend

Habitat Conservation Areas (HCA's)

- Tortoise Desert Wildlife Management Areas (DWMA's)
- Mohave Ground Squirrel Conservation Area
- Bendire's Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- Other Conservation Areas

Other Map Features

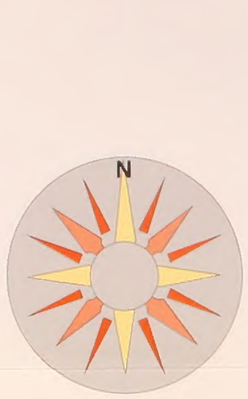
- Special Review Areas
- Critical Habitat on Military Lands
- Significant Ecological Areas (LA Co.)
- Existing ACEC's
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Enduro Route
- Connector Route
- Race Routes
- Mojave River
- Plan Boundary
- Existing Open Areas
- Open Area Expansions
- Fremont Recreation Area (New)
- Linkages

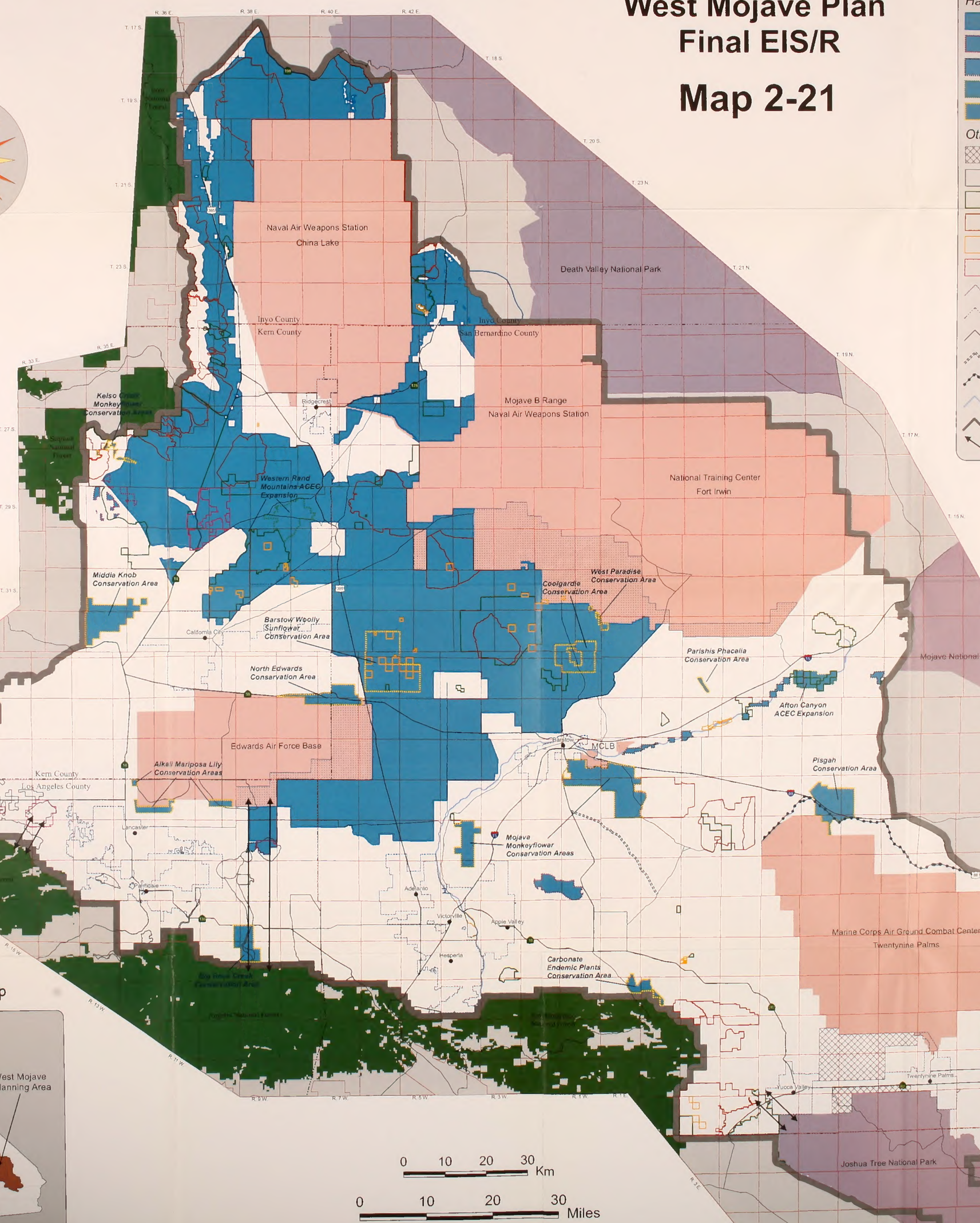

Features displayed are generalized and should not be considered precise
Barstow Woolly Sunflower Conservation Area
North Edwards Conservation Area
Edwards Air Force Base
Alkali Mariposa Lily Conservation Areas
Parish's Phacelia
Afton Canyon ACEC Expansion
Mojave National Preserve
Pisgah Conservation Area
Mojave Monkeyflower Conservation Areas
Carbonate Endemic Plants Conservation Area
Big Rock Creek Conservation Area
Marine Corps Air Ground Combat Center Twentynine Palms
Joshua Tree National Park
Angeles National Forest
San Bernardino National Forest
Kern County
Los Angeles County
San Bernardino County
Riverside County
California City
Lancaster
Palmdale
Barstow
MCLB
Adelanto
Victorville
Apple Valley
Hesperia
Yucca Valley
Twentynine Palms
Locator Map
West Mojave Planning Area
0 10 20 30 Km
0 10 20 30 Miles
Scale: 1 : 450,000
2/11/05

Alternative F Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-21





Features displayed are generalized and should not be considered precise

Legend

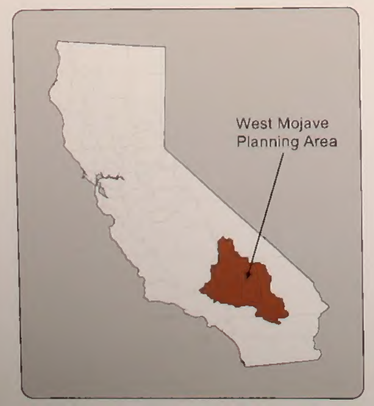
Habitat Conservation Areas

- Mojave Ground Squirrel Conservation Areas
- Bendireís Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Significant Ecological Areas (LA Co.)
- Existing ACECis
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
- JV to Parker Race Corridor
- Mojave River
- Plan Boundary
- Linkages

Locator Map



0 10 20 30 Km

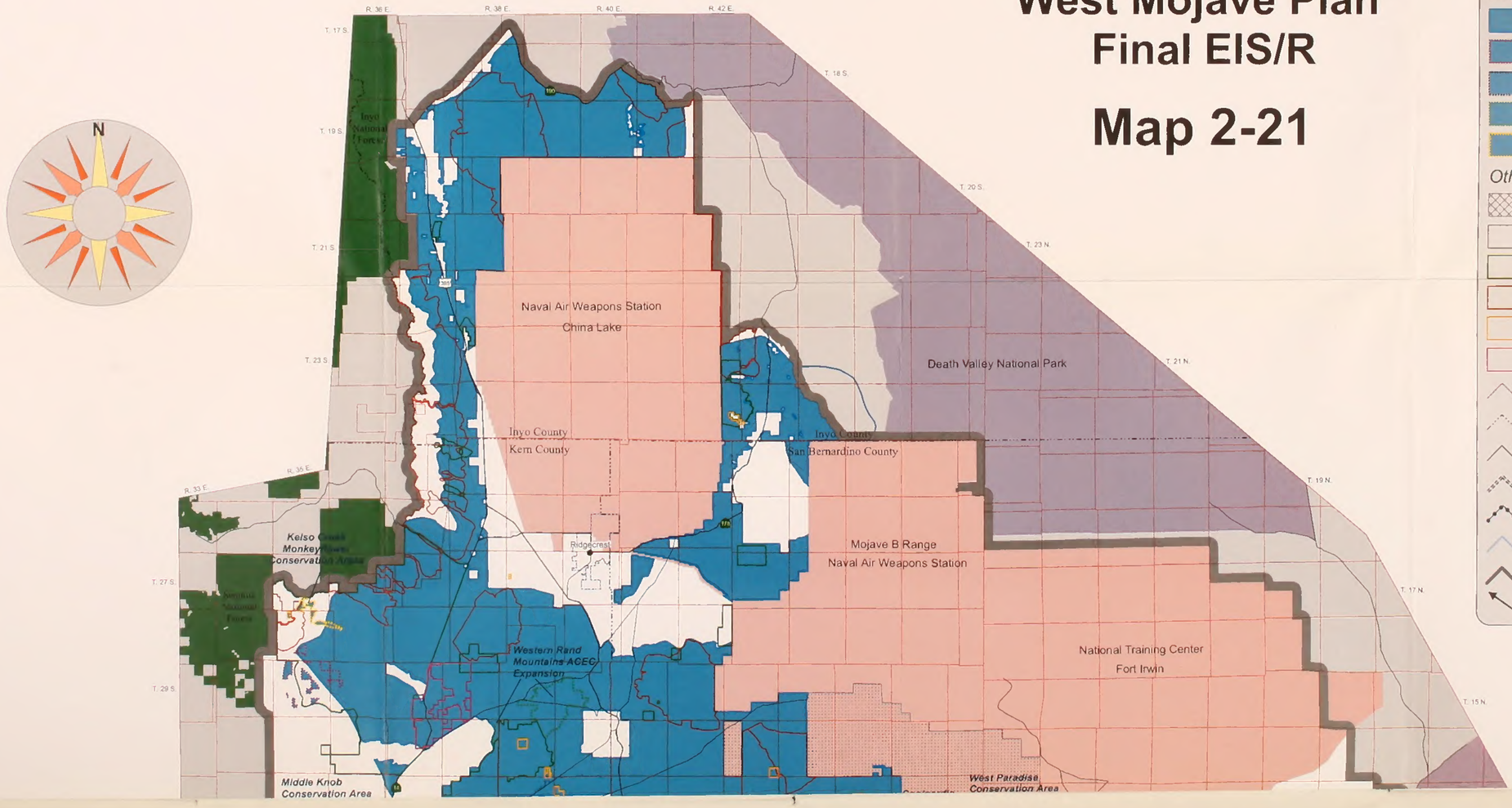
0 10 20 30 Miles

Map 3-1 – Political Boundaries and Land Ownership

Alternative F Conservation Areas

West Mojave Plan
Final EIS/R

Map 2-21



Legend

Habitat Conservation Areas

- Mojave Ground Squirrel Conservation Areas
- Bendireis Thrasher Conservation Areas
- Mojave Fringe-toed Lizard Conservation Areas
- ACEC Expansion Areas
- Other Conservation Areas

Other Map Features

- Special Review Areas
- Significant Ecological Areas (LA Co.)
- Existing ACECis
- BLM Wilderness Areas
- Calif. Dept. of Fish and Game
- State Parks
- City Limit Boundaries
- County Lines
- Major Roads
- Stoddard to JV Connector Route
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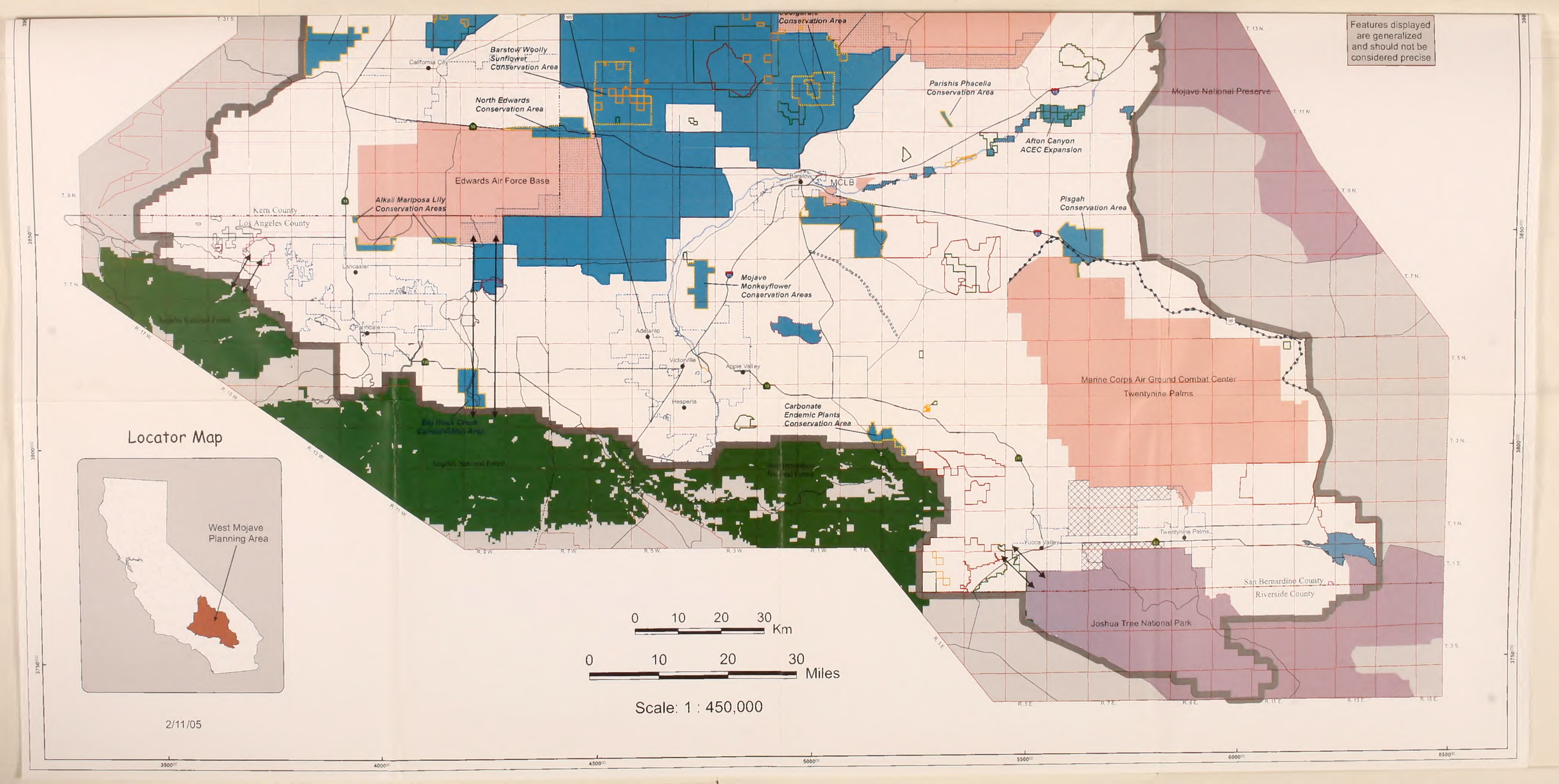
- Mojave River
- Plan Boundary
- Linkages


Features displayed are generalized and should not be considered precise
Barstow Woolly Sunflower Conservation Area
North Edwards Conservation Area
Parishis Phacelia Conservation Area
Mojave National Preserve
Afton Canyon ACEC Expansion
Edwards Air Force Base
MCLB
Alkali Mariposa Lily Conservation Areas
Pisgah Conservation Area
Kern County
Los Angeles County
Mojave Monkeyflower Conservation Areas
Marine Corps Air Ground Combat Center
Twentynine Palms
Carbonate Endemic Plants Conservation Area
Joshua Tree National Park
San Bernardino County
Riverside County
Locator Map
West Mojave Planning Area
0 10 20 30 Km
0 10 20 30 Miles
Scale: 1 : 450,000
2/11/05

Political Boundaries and Land Ownership

West Mojave Plan
Final EIS/R

Map 3-1

N

Legend

- Cities
- Major Roads
- City Limit Boundaries
- County Lines
- NPS Boundaries
- Mojave River
- Plan Boundary

Land Ownership

- US Bureau of Land Management
- National Park Service
- US Forest Service
- Military
- Tribal Lands
- State Lands
- County / City / Regional
- Private

Features displayed are generalized and should not be considered precise

Inyo County
Kern County
San Bernardino County
Los Angeles County
Riverside County

Ridgecrest
California City
Barstow
Lancaster
Palmdale
Adelanto
Victorville
Apple Valley
Hesperia
Yucca Valley
Twentynine Palms

Naval Air Weapons Station China Lake
Death Valley National Park
Mojave B Range Naval Air Weapons Station
National Training Center Fort Irwin
Edwards Air Force Base
MCLB
Mojave National Preserve
Marine Corps Air Ground Combat Center Twentynine Palms
Joshua Tree National Park
Inyo National Forest
Sequoia National Forest
Angeles National Forest
San Bernardino National Forest

190 395 178 14 58 15 40 66 18 138 247 62

0 10 20 30 Km

0 10 20 30 Miles

Locator Map

West Mojave Planning Area

CD Maps

The following documents are included on this CD:

1. A larger Appendix S: the complete Carbonate Habitat Management Strategy, upon which the short version Appendix S, included in Volume Two, is based
2. All FEIS hardcopy maps plus various oversized maps (2-18, 2-20, 3-1, 3-11, and 3-23) found only on the CD
3. DEIS Public Comment letters
4. Species Accounts
5. Routes Designation maps

Routes Designation Maps

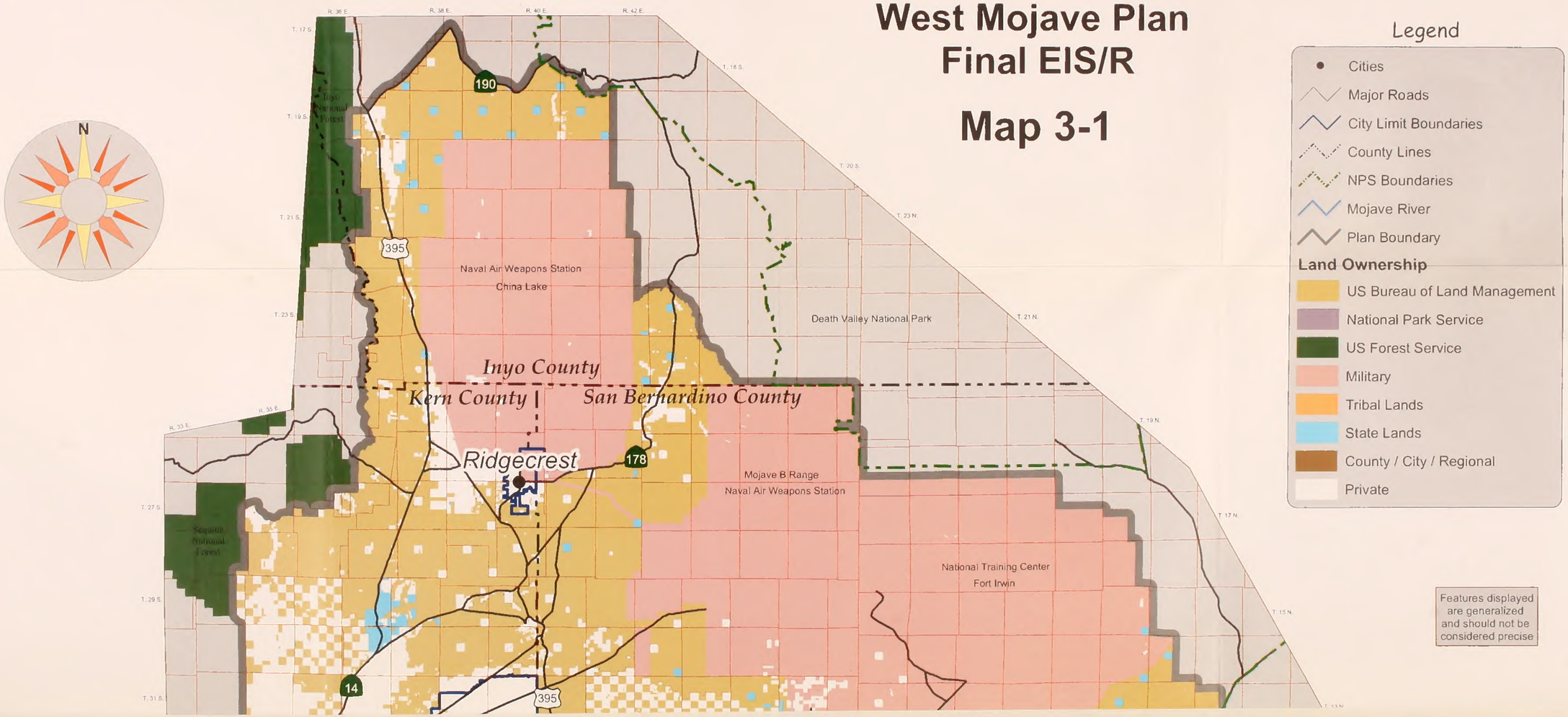
The attached compact disk (CD) includes copies of maps referenced in the text of the West Mojave Plan FEIR/S. Maps can be viewed using the Adobe Acrobat Reader, version 4 or 5, on your home or local library computer. Place the disk in the computer and view the contents of the disk using the Adobe Acrobat Reader. Click on a file bearing the name of the map that you wish to view.

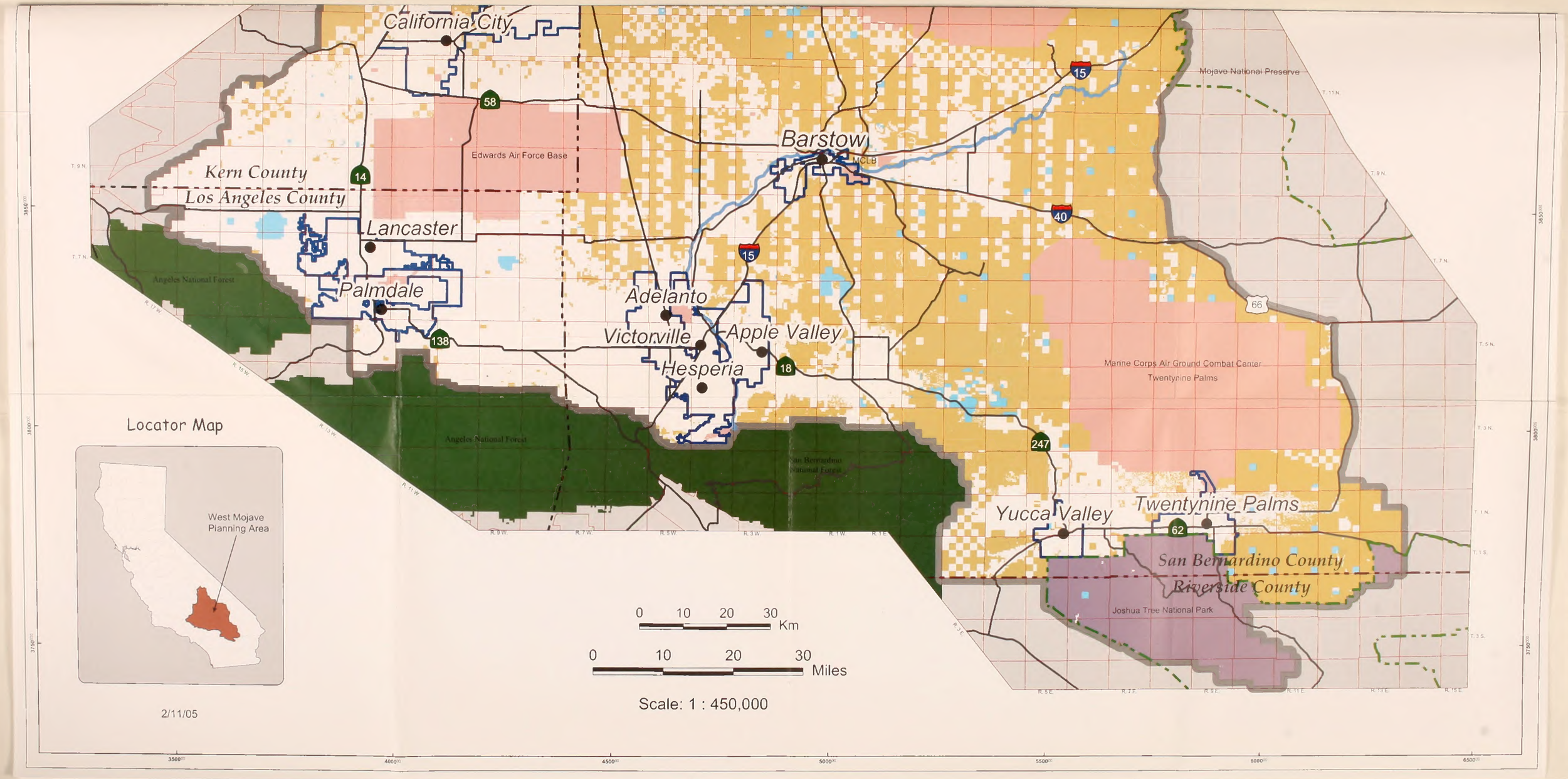
Maps of the proposed motorized vehicle access network are also included on the attached CD. Maps are full color, 1:24,000 scale USGS topographic quads. Where applicable, the route number us attached for easy cross-referencing to the tables presented in Appendix R. You will find that this will enable you to view any section of the route network at a variety of scales and to print your own maps from the attached files. Subregion and motorized access zone boundaries are indicated on the maps.

There are two complete sets of maps on the CD, each consisting of approximately 90 maps. One set is for the Proposed Action (Alternative A) and the other set is for the No Action Alternative (Alternative G). An index map is included for each set. Each index map presents a map of the western Mojave Desert, together with the location of each numerically labeled quad map. The proposed action index map is labeled "FEIS_pr_index_map.pdf", while the No Action Alternative index map is labeled "6.30-03_index_map.pdf".

Each map set presents a complete set of quads for all of the public lands within the western Mojave Desert with routes (i.e., quads with no routes are not included). Maps are numbered sequentially. The lowest numbered maps cover the northern portion of the West Mojave, while the higher numbered maps cover lands further south. If you find, for example, that an area of interest to you is covered by Map 25, you can view the proposed action network for this area by clicking on the file labeled "FEIS_pr_25.pdf", while the existing network (that is, the No Action Alternative) for this area can be found in the file labeled "6.30.03_25.pdf".

Political Boundaries and Land Ownership




California City
58
Edwards Air Force Base
Barstow
MCLB
15
Mojave National Preserve
Kern County
Los Angeles County
14
Lancaster
40
15
Angeles National Forest
Palmdale
Adelanto
66
Victorville
Apple Valley
138
18
Hesperia
Marine Corps Air Ground Combat Center
Twentynine Palms
Angeles National Forest
San Bernardino National Forest
247
Yucca Valley
Twentynine Palms
62
San Bernardino County
Riverside County
Joshua Tree National Park
Locator Map
West Mojave
Planning Area
0 10 20 30
Km
0 10 20 30
Miles
Scale: 1 : 450,000
2/11/05

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